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ABSTRACT

An evaluation was made of the adoption of curriculum changes mandated by the Technician Education Council (TEC) by 78 colleges in England. The study concentrated on the processes of adaptation that occurred in the colleges in order to cope with the degree of change required by TEC. Data were collected via questionnaires, interviews, case studies, and an analysis of documentation during a 3-year period. The results of the study describe how a massive curriculum project in a complex technical area was generally accepted by the colleges, in spite of many problems, as an improvement in the way technician curricula are provided. Certain problems were identified, however. These included the recurrent criticism that because of pressure of existing work, of time and lack of support, much local curriculum had to be rushed, and there was therefore insufficient opportunity for genuine curriculum reflection. There were also complaints regarding the administrative burden that accompanied the curricular demands and questions were raised about the relationship between curriculum design and implementation. The evaluation concluded that lessons emerged from the curriculum change study regarding methods of disseminating curriculum policy; the isolation of curriculum issues from those of organization and resources; and the need to trial-test and supportively evaluate curriculum change. (KC)

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Further Education Curriculum Review and Development Unit

CURRICULUM CHANGE

An Evaluation of TEC Programme Development in Colleges

The Main Findings

Programmes:
Mechanical and Production Engineering, A5
Building Studies, B2
Science, C1

Awards:
Technician Certificate (TC); Technician Diploma (TD)

Data Collected: 1978 - 1980

CE 033 167

December 1981

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(1) reviewing the range of existing curricula and identifying overlap, duplication and deficiencies

(2) determining priorities for action to improve the total provision and suggesting ways in which improvement can be effected

(3) carrying out specific studies, helping with curricular experiments, and contribution to the evaluation of objectives, and

(4) disseminating information about the process of curriculum development in FE.

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Preface

1. The following report represents a unique attempt to evaluate the curriculum process introduced by the Technician Education Council. The report is not insubstantial, it has taken almost three years and yet it samples only a modest fraction of the total output of TEC. This not only helps to describe the magnitude of the problem that has confronted the FHE system since 1976 but also indicates the way in which we appear to consistently underestimate the need to evaluate curriculum development.

2. Throughout the report and its conclusions, is the persistent criticism that because of pressure of existing work, of time and lack of support, local curriculum development had to be rushed: there were no opportunities for curriculum trials, Standard units were uncritically accepted, programme guidelines were rarely challenged and to many teachers the validation process became identified as an elaborate and sometimes desperate paper-game, rather than an opportunity for genuine curriculum reflection.

3. As such, with hindsight, many valuable opportunities were lost, and too many mistakes may well have been made. The general acceptance of the 15-unit Certificate (and 25-unit Diploma) coupled with demanding assessment schedules, undoubtedly overloaded teaching schedules and significantly reduced opportunities for practical work. The use of a particular simplified version of Bloom's Taxonomy of Educational Objectives, whilst no doubt an invaluable aid to analysis and discussion, has in many ways been interpreted as the ultimate in curriculum and assessment design, to the detriment of more creative curriculum innovation. The autonomous and sometimes idiosyncratic demands of the individual programme committees often produced confusion, duplication and ambivalence in the development and validation process.

4. The strategy of this study involved 78 colleges and the methodology of data collection included questionnaires, interviews, case studies and an analysis of documentation. This study has largely concentrated on 'internal' curriculum issues. A complementary study by the National Foundation for Educational Research, due to be completed in 1982-83, will be concentrating on more 'external' factors such as the perceptions, progress and attitudes of students and the views of employers in relation to involvement and standards, etc. Inevitably, for the sake of completeness, some duplication may exist but this hopefully, has been kept to a minimum.

5. Many of the issues identified in the study are not unique to TEC or indeed to further education. Problems arising out of inadequate teacher training, dated industrial experience, inflexible teaching modes and poor curriculum dissemination, were not created but aggravated by the demands of TEC. These problems have been around for some time. On the other hand, TEC appears to have created its own spectrum of problems. Its neglect of the Regional Examining Bodies and RACs, in some cases heavily involved in existing technician courses, removed initially at least, a source of local curriculum support for many teachers. The rapid production of the first generation of Standard units resulted, as the report says, in the 'widespread adoption of units of uncertain quality'. The continuing lack of well validated externally available tests, the 'apparent haste' in the development of the innovative TEC policies and the sometimes 'unnecessary' changes have, according to the study, undoubtedly contributed to uncertainties about standards by employers and teachers alike.

6. The suggestions in the report with respect to teaching and learning methods may not be entirely welcome to all readers. Generally the evaluation concludes that in spite of a major aim of TEC being concerned with this area, 'there have not been substantial changes in teaching methods'. It indeed goes further; and states that the way in which TEC has used and validated objectives and assessment plans, has put too much accent on *what* the students learn rather than *how* they learn. This neglect of the 'dynamic inter-relationship' between ends and means is identified as a deficiency by the report which goes on to suggest that colleges and TEC should consider the desirability of describing teaching and learning strategies in their development and review of units and programmes.

7. The report describes examples of apparent underestimations by TEC of the demands it would place on the system: consultations with employers (a perennial problem in a diversified industrial society); a

complex and demanding administrative burden (now being simplified); the assumptions made with respect to resources (for staff and curriculum development); the phasing out of existing courses (hostility still remains) . . . It is tempting to conclude that if the expertise was not there to foresee what now appear to be obvious problems, then at least some form of evaluated pilot studies could have been set up. This concept, until recently, was strange to FE and perhaps therefore, if blame must be apportioned, it belongs to all those in education who acquiesce to untried curricular experiments.

8. Nevertheless, notwithstanding the above, what this study essentially describes is how a massive curriculum project in a complex technical area was generally accepted by the colleges, in spite of its many problems, as an improvement in the way we provide technician curricula. The publication of this report will coincide with many reviews and re-validations of TEC programmes, and it is hoped that it will facilitate those processes.

9. On a more global basis, this report also illustrates, not for the first time, the way in which we under-resource curriculum development in FE. Sooner or later it must be realised that attempting massive curriculum change on the cheap is false economy. The price is eventually paid in terms of failure, expensive modification and non-productive hostility. In this context the generalised lessons that emerge are briefly:

i. no major curriculum innovation can succeed solely on the basis of issuing unilateral policy statements to the centres of implementation;

ii. large scale innovation processes should not concentrate only on curriculum elements but should also take into account the organisational and resource implications of the changes they propose;

iii. new proposals should be trial-tested and supportively evaluated, where appropriate by an independent project, and staff development needs should be an essential element of this process.

In the case of TEC, who are proving to be responsive to college demands and currently reviewing their policies, this study is, in many respects, eight years too late. Nevertheless it is to be hoped that the report will not only be of assistance to those engaged in TEC work, but will contribute to the fundamental change of attitude that appears necessary to bring about a revaluation of curricular change.

10. The FEU Board of Management obviously take responsibility for the publication of the report, but in so doing it would like to express its appreciation to Dr Christopher Parkin as project leader and his team, without whom, there would be no report.

Jack Mansell

June 1981

Acknowledgements

Without the helpful co-operation of many teachers and managers, with varying roles in the introduction of TEC programmes, this study would not have been possible. To all those who have given facts, opinions, and encouragement our grateful thanks. To those who have offered help but to whom we have been unable to respond due to the constraints of time or the sampling procedures adopted we ask for their understanding.

In particular we would like to thank:

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Dr S M Kaneti Barry, Lecturer, Brunel University
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Dr K Dean, Principal, South East London College
Mr J Deboo, Group Training Manager, Baker Perkins Holdings Ltd
Dr M Eraut, Reader, University of Sussex
Mr W Jordan, Vice-Principal, Shirecliffe College, Sheffield
Mr W A C Kendall, Principal Lecturer (latterly), Swindon College
Mr E Mitchell, Chairman, TEC Research Sub-Committee (1977-80)
Mr N Morrison, SI, Department of Education, Northern Ireland

Contributors undertaking commissioned component studies, Mr R Battey (Middlesex Polytechnic), Mr R E Challis (Further Education Staff College, Coombe Lodge), Mr S Dodd, Mr R B Lovell, Dr D I McCallum, Dr R Oxtoby (Garnett College), Mr F L Fairhurst (Trent Polytechnic), Mr M Guggenheim (Huddersfield Polytechnic), Mr R Hembrough (Bolton College of Education (Technical)), Mr R E R Welch (Chelmer Institute of Higher Education) and Mr R Pritchard, and their colleagues;

Officers of the Technician Education Council who readily gave us access to the data we requested;

Officers of the National Association of Teachers in Further and Higher Education and Association of College Principals who, on our behalf, informed their members of this study;

Colleagues undertaking the parallel NFER evaluation of TEC programmes for their helpful co-operation, and other researchers who made their theses available.

We are equally grateful to all those who contributed evidence based on their experience of introducing TEC programmes who, regrettably, we cannot mention by name in order to preserve the anonymity of colleges.

Christopher Parkin
FEU Development Officer

The Structure of this Report

This description and evaluation of the introduction of TEC Certificate programmes in Mechanical Engineering A5, Building Studies B2, and Science C1 is presented in two parts. Part 1, this volume, is an overview for a general audience of the main findings with accompanying FEU Commentary. Part 2 will record additional data and further details of the methodology. Most of the data was collected in the academic years 1978-79 and 1979-80, and relates to the period 1974-80.

Part 1 (This volume)

Chapter 1 provides an introduction to the aims, purpose and origin of the study and an interpretation of the terms curriculum and curriculum development. Chapter 2 outlines the strategy adopted in sampling the colleges and TEC programmes, the principal components of data collection and procedures. The qualifications and experiences of teachers who responded in this study, and some of their general attitudes to the introduction of TEC programmes are included in Chapter 3. The entry qualifications to programmes of the students who responded to questionnaires are also included. The main findings are presented in Chapters 4 and 5. Chapter 4 is particularly concerned with *curriculum issues* (objectives, teaching and learning approaches, the assessment processes, and more briefly the subject matter of TEC programmes). Chapter 5 considers the *process of development of programmes*. Developments at the national TEC centre are outlined but the main focus concerns the analysis of needs, design of programmes, implementation and evaluation in the colleges. Further aspects of a topic introduced in Chapter 4 may occur in the description of the development process in Chapter 5, and cross reference may be necessary. Compartmentalisation of issues, even if possible, would not reflect the reality of the curriculum and its development in practice. For example matters concerning assessment (paragraphs 104-116, 199 and 232-242) have pervaded throughout the introduction of TEC programmes. Readers previously unfamiliar with the work of the Technician Education Council may wish to read 'Development at the National Centre' (Chapter 5, paragraphs 117-138) before the curriculum issues described and discussed in Chapter 4. A concluding summary, Chapter 6, completes the main report.

For Chapters 2 to 5, commentary by the Further Education Unit (FEU) is presented (on the left hand side of the page) alongside a description of the main findings to which it relates, in such a way that it can be read independently should the reader wish.

References, in parenthesis in the text, are listed alphabetically on pages 119-120.

Note:

In the text the word 'teachers' is used to embrace the academic staff of colleges as a whole at all levels from Lecturer I to Principal. Where the sum of questionnaire responses does not add up to 100% (a) small discrepancies are due to 'rounding' of constituent figures to the nearest whole number; (b) bigger discrepancies are due to omission of non-respondents.

Part 2 (A limited distribution will be available from the Unit)

Part 2 of the report will comprise the following components:

A. The work activities of teachers of TEC programmes;
B. The interpretation and implementation of selected units;
C. Case studies of the curriculum development process;
D. Questionnaire responses from college teachers;
E. The methodology of the study.

CHAPTER 1

Introduction

Aim and purpose

Origin

The curriculum and curriculum development

Aim and purpose

1. The Technician Education Council (TEC) was established in 1973 to develop, administer and review a unified national system of courses of technical education. This report of an independent study by the Further Education Curriculum Review and Development Unit (FEU) examines the consequences of the policies of TEC on practice in the colleges and the ways in which programmes of study have been developed.

2. The purpose of the study is to provide information with an interpretation of value to:

a. the further education service at large (teachers and colleges, policy makers, providers and users);
b. the Further Education Curriculum Review and Development Unit, as a major contribution to its review of curriculum provision and dissemination of information about the process of curriculum development;
c. the Technician Education Council, as an independent evaluation of how curricula are being developed and implemented in colleges; and
d. all those concerned with the process of curriculum innovation.

It is hoped that the study will contribute to an understanding of the process and outcomes of a major change in FE curriculum provision.

Origin

3. The Technician Education Council (TEC) was established in March 1973 in fulfilment of a recommendation of the Haslegrave Committee on Technician Courses and Examinations (Haslegrave, 1969).[*] In announcing the creation of the Council, the Secretary of State summarised its terms of reference as follows:

> 'The Council will be concerned in the development of policies for schemes of technical education for persons at all levels of technician occupations in industry and elsewhere. To this end it will, as proposed in the Haslegrave Report: plan, administer and keep under review the development of a unified national system of courses for such people and will devise or approve suitable courses, establish and assess standards of performance, and award certificates and diplomas as appropriate.' (TEC Report and Accounts, October 1973-September 1974.)

4. In the summer of 1978 when this study began some 42,000 students were working for TEC awards on over 1,200 programmes validated by the Council's committees. By the 1980-81 academic session the numbers had grown to approximately 180,000 students and 4,000 programmes. During this period several publications and articles drew attention to the magnitude of the changes being introduced with critical commentary on the development process (eg see Roberts 1976, Mansell, J. 1976, MacRory, Beaumont and Taylor, 1977).

5. Evaluation of the curriculum provision in Further Education is part of

---

[*] Background to the establishment of the Technician Education Council.

Throughout the 1960s there was continuous concern about the apparent 'wastage' from existing technician courses (ie where a student embarks on a course but drops out before completing it), about the adequacy of the dual provision of National Certificate and Diploma Course on the one hand and the technician courses of the City and Guilds of London Institute (CGLI) on the other. The former courses were characterised by an entry requirement of four 'O' level passes and associated with provision for a more academic student who might in due course proceed to a higher education; whereas the latter were appropriate for the more practically oriented. Movement of a student between one course and another was minimal. Uncertainty about the nature of the job activities of a technician across a wide variety of industry and a growing realisation of the changing needs of industry compounded the situation.

In 1967 a 'Committee on Technician Courses and Examinations' under the chairmanship of Dr. H. L. Haslegrave was appointed by the National Advisory Council on Education for Industry and Commerce:

> 'to review the provision for courses suitable for technicians at all levels (including corresponding grades in non-technical occupations) and to consider what changes are desirable in the present structure of courses and examinations.' (Technician Courses and Examinations – Haslegrave Report, page 1.)

The Committee stated how, in its view, a modern, flexible and well-conceived pattern of technician courses and examinations should be devised, and the purpose it should be expected to fulfil:

> 'It should be based on courses designed to help produce educated and trained technicians capable not only of meeting an immediate need for skill and knowledge, but of adapting themselves readily to meet changes in these needs as they arise. The courses should recognise that the continuous development in the use of manpower in industry and commerce can quickly change the educational needs of particular technicians, and be capable of responding to such changes rapidly and effectively. The industrial and commercial bodies concerned with the training and associated further education should have full opportunity of collaborating with the educational interests in the work of devising new courses and keeping existing ones up to date.' (Haslegrave Report, page 46, paragraph 150.)

the terms of reference of the Further Education Unit (FEU). Following discussion between the officers of the Unit and of TEC the Unit decided in 1978 to examine the effects (the consequences and impact) of the policies and practices of the Council on the curriculum and its development in colleges.

6. Following the appointment of an FEU Development Officer to assume responsibility for an evaluation programme, draft proposals were prepared for consideration by the Board of Management of the Unit. Members of the TEC Research Sub-Committee were also invited to comment. An initial phase of enquiry from May to November 1978 enabled the scope of the study to be further defined. At its meeting in December 1978, the Board of Management agreed that a co-ordinated programme of work would be undertaken comprising, an evaluation of the effects of TEC on the organisation of teaching and learning and on the day-to-day practices of teachers, and an evaluation of the process of TEC programme development and implementation. The Board established an Advisory Group representative of a wide range of experience relevant to the study to advise on more detailed aspects of the methodology and to consider working papers produced by the Development Officer.

7. A complementary project sponsored by the Department of Education and Science, and due for completion in 1983, is being undertaken by the National Foundation for Education Research (NFER). Whereas this Report of the FEU study describes and evaluates the practices in colleges focusing on the curriculum (teaching, learning and assessment) and on its development, the NFER study aims to describe the characteristics, progress and attitudes of students enrolled on selected TEC programmes, to investigate the acceptability of the programmes and newly qualified technicians to employers, and to examine the role of the employers in the design and development of TEC programmes. Contact between the FEU and NFER projects has been maintained in order to avoid undue overlap.

The curriculum and curriculum development

8. *Conceptual frameworks.* Numerous models have been advocated to aid analysis, definition and development of curricula. The findings of this report are presented and interpreted with the help of the following concepts of the curriculum and curriculum development.

9. *Curriculum.* The FEU Board of Management has adopted a working definition of the term 'curriculum' which comprehends not only the design of courses and programmes but the activities by which colleges and associated agencies promote learning by students [FEU Annual Report 1977-78]. A curriculum is typically characterised by a statement of INTENTIONS (aims and objectives), of CONTENT (expressed as subject matter and/or teaching strategies or learning experiences) and of procedures for ASSESSING the learning which it is designed to achieve.

10. *Curriculum development.* Curriculum development denotes bringing about changes in both programmes and methods of teaching and learning. The development of a curriculum occurs within the constraints of the organisations and the influences of the people involved. The principal parties in the development of technical education curricula are:

the colleges, their teachers (and prospective students),
the industries, the employers (and prospective technicians),
the curriculum validating agency, TEC, its members and officers,
the resource providers, DES and the LEAs.

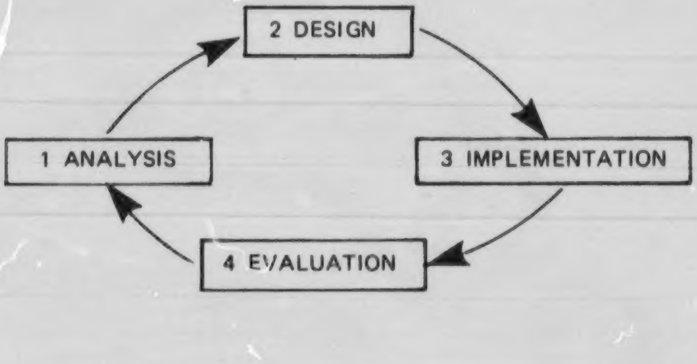
11. A simple model (Figure 1) for the process of curriculum development identifies four stages:

1. ANALYSIS of the situation in which the curriculum is required: of needs, and of available resources,
2. DESIGN of the curriculum to meet these needs: the identification of intentions.
3. IMPLEMENTATION and INTERPRETATION of the design: the outcomes,
4. EVALUATION: monitoring and feedback as to whether the needs are met, and the design and implementation are appropriate.

These stages should not be regarded as necessarily discrete, eg evaluation may be formative as well as summative, and in any event the process is repetitive and/or cyclic.

A curriculum will not be developed adequately unless all stages of the process are undertaken. Ideally the term CURRICULUM DEVELOPMENT should relate to the whole process. It is recognised that common usage frequently regards curriculum development as stages 1 and 2.

***Figure 1** A simple model of the process of curriculum development*



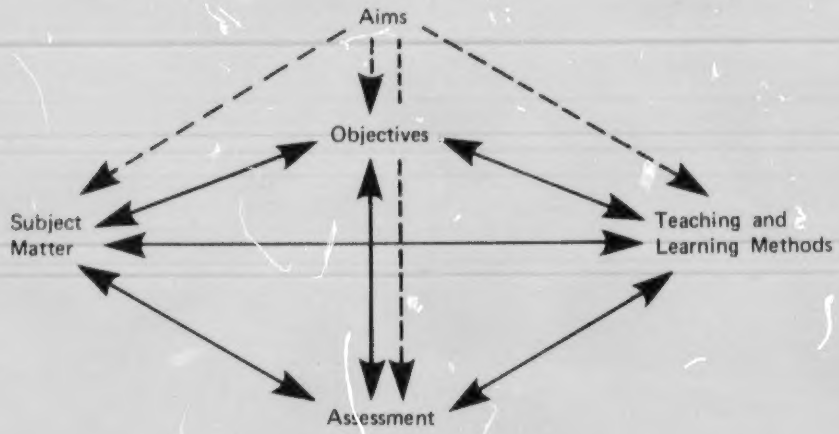
12. *Curriculum design – a decision making perspective.* Curriculum design requires decisions to be made about aims, objectives, subject matter, teaching and learning methods, the assessment process and their inter-relation (Figure 2).

In the design process one or more of these elements may be given greater emphasis or priority in decision making. The decisions made about each element are likely to influence the practice when the curriculum is implemented. The 'static' curriculum design on paper, becomes on implementation a 'dynamic' curriculum. How closely the curriculum in action matches the curriculum in design will depend not only upon the clarity and nature of the curriculum statement, but also on an array of contextual factors in which it is implemented (eg the skills and abilities of the students and teachers, the college organisation and management, the relevance of the curriculum to the enrolled students).

Where the design has carefully taken the context into account then a closer match between intentions and outcomes is likely.

The relationships between the curriculum of TEC programmes in action and the emphasis of decisions made at the design stage will be discussed. (See, eg, pages 32, 51 and 92.)

***Figure 2** A model of the interacting curriculum elements*



(adapted from Eraut, M. R., et al, 1975)

CHAPTER 2

Research Strategy

Scope and scale of the enquiry

Selection of colleges and associated A5, B2 and C1 programmes

Procedures

Scope and scale of the enquiry

13. The origins of the project determined that its concern was to be the development and implementation of TEC programmes in the college context. An initial phase of open-ended enquiry was considered essential so that the programme might not be unduly influenced either by articles already published, such as those referred to above or by the previous experience of the introduction of specific TEC programmes by the FEU's Development Officer undertaking the study. In this period (May to October 1978) it was considered appropriate to explore issues as they were presented and obtain opinion from a wide range of people rather than limiting interest to investigating immediately whether, for example, certain aims or intentions within the TEC Policy Statement and Circulars were being achieved.* There was a need to meet people involved in a variety of ways in TEC development and to attempt to identify how the study might be of value to them.

14. Various parties involved in the introduction of TEC programmes indicated that in their opinion this study would be useful if it could make an independent and objective contribution concerning:

a. the development of programmes – compare the development of single-college and joint programme submissions, identifying who is involved in development,

b. the teaching, learning and assessment processes – the day-to-day practices of teachers, the demands upon them, their interpretation of the curriculum.

Educational policy makers and providers required independent evidence of the practices in colleges, and teachers in colleges wished to learn more about practice in other colleges to help to overcome their uncertainty as to how TEC programmes might best be implemented. There was a concern, certainly that of the FEU, to learn about the extent of curriculum change and how it was being or might be effected.

15. Many of the issues to be the subject of study were sensitive in the context of individuals' roles and experience. As is usual in work of this kind, care has been taken to distinguish between data which is publicly available, that received in confidence but which can be disclosed providing the source cannot be identified, and that which cannot be disclosed without the agreement of the source. Following advice from the Advisory Group the colleges from which evidence has been collected have not been identified.

FEU Commentary

Scope of the evaluation

An initial investigatory phase established issues to be studied: the curriculum development process – single college and inter-college joint TEC programmes, the participation of teachers in programme development; the teaching, learning and assessment processes – the interpretation of TEC policy and of the curriculum by teachers and the demands upon them. An evaluation of the acceptability of TEC programmes to industry and the progress of student achievement is the subject of a complementary study being undertaken by the NFER.

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* Some of the initial findings were briefly described at two Study Conferences held at the Further Education Staff College, Coombe Lodge, in June 1979. The paper presented to the conference also outlines characteristics of formal as opposed to informal curriculum evaluation. (Parkin 1979.)

FEU Commentary

Scope and scale of the evaluation

The study is limited to evidence from the development of programmes in the areas Mechanical Engineering A5, Building Studies B2 and Science C1 programmes leading principally to Certificate Awards of the Council.

Evidence was collected during the period May 1978 to September 1980, from 78 colleges selected randomly with stratification by region and size as a sample of colleges in England and Wales. Each college participated in one or occasionally more than one component of the study.

The study attempts to reflect, through the method of sampling, illustrations of typical practice, rather than to seek to describe or avoid particularly good or poor practice.

16. The evaluation is almost exclusively confined to the introduction of programmes for Certificate and Diploma awards in England and Wales. Few programmes leading to the Higher Awards had been validated at the commencement of the work, and a limited focus was considered desirable. It was necessary to select from both the growing number and range of TEC programmes available taking into account initial starting dates, and the colleges involved either independently or in collaboration with others. From the three sectors of Technician Programmes, A, B and C and the 22 programme areas established by TEC, Production Engineering A5, Building Studies B2 and Science C1 were chosen as the main focus for the study. These represented the area in each sector for which the largest number of programmes had been validated by TEC and which would be studied by a high proportion (about 50%) of those students enrolled on all TEC programmes during the period of study.

Selection of colleges and associated A5, B2 and C1 programmes

17. A list of all the establishments in the Further Education Sector in England and Wales which might offer technician programmes was stratified according to region and size of college. Two 15% samples were drawn at random to give a total of 130 colleges. The new TEC programmes validated for operation in these colleges were identified from TEC Computer Programme listing (February 1979). Subsequently the list was updated with respect to Science Programmes which commenced in September 1978, but which were not on the computer records at that time. Thirty-two of the 130 colleges did not offer A5, B2 or C1 programmes at Certificate and/or Diploma level (20 of these institutions being Polytechnics or Colleges of Higher Education), so these were withdrawn from the sample. A further two colleges in which evaluation studies being undertaken by others were known to be in progress were also removed, leaving a sample pool of 96 colleges.

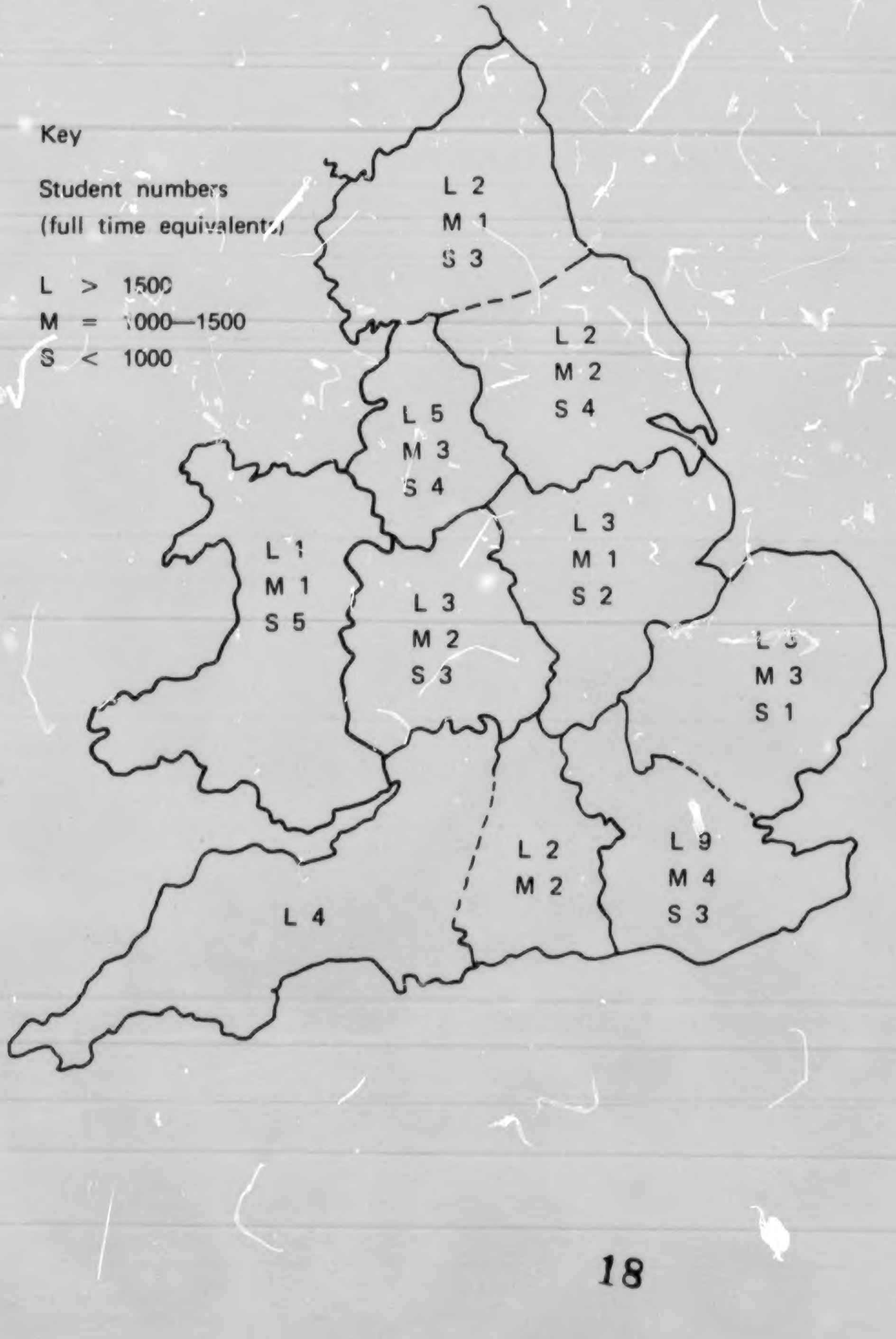
All of these colleges (with the exception of one small college) were invited to participate in usually one (occasionally more than one) part of the study. The demands which colleges say TEC, and other work makes upon them was reflected in the greater willingness of some of them to receive visits than to have staff complete questionnaires. Figure 3 (overleaf) shows the distribution of the 78 colleges which agreed to participate by region and size.

Procedures

18. **Approach to the evaluation.** The literature of curriculum evaluation discusses alternative approaches and styles. Two of the approaches often contrasted are evaluation as 'scientific-testing' and evaluation as 'illumination'. (See, eg, Hamilton 1976.) In the former the evaluator establishes a programme which usually seeks to provide quantitative evidence of statistical significance carefully controlling many of the variables in the context examined. In the latter the evaluator seeks to portray as much of the colour and reality of the situation he examines as possible. The illuminative evaluation does not reject the need for quantitative data, but rather the value of somewhat narrowly focused studies which may devote substantial resources to one aspect of the curriculum in a highly controlled way when the provision, in educational terms at least, depends on an interplay of so many factors. This study is influenced particularly by the philosophy of the illuminative approach. It includes quantitative data to illustrate the extent of a particular opinion or activity.

19. The design of the study deliberately chose to collect information through a number of modes of enquiry. A number of commissioned studies were established and co-ordinated by the FEU Development Officer. Seventeen people have been involved in collecting evidence which describes practice, although engaged for short periods of time equivalent to 10-30 working days. These members of the evaluation team had wide experience of working in the FE Sector, and an interest and commitment to this kind of study. About half of

***Figure 3** Geographical distribution of colleges participating in aspects of the study, by size*


Key
Student numbers
(full time equivalents)
L > 1500
M = 1000—1500
S < 1000
L 2
M 1
S 3
L 2
M 2
S 4
L 5
M 3
S 4
L 1
M 1
S 5
L 3
M 1
S 2
L 3
M 2
S 3
L 3
M 3
S 1
L 4
L 2
M 2
L 9
M 4
S 3

them had relevant post-graduate qualifications. It is believed that the several modes of enquiry and contributions by a number of researchers within an overall framework add considerably to the validity of the study. The progress of the component studies was monitored.

20. All component studies used only colleges from the sample pool. Care was taken to establish satisfactory relationships with the colleges before undertaking any aspect of the study. Wherever possible steps were taken to ensure the sample of teachers met or responding to questionnaires and checklists were representative of the total population. Notes on each of the principal component studies are given below and further detail is available in Part 2. Most of the evidence was collected during the academic year 1979-80. The distribution of colleges taking part in terms of both number and size is shown as Table 1.

***Table 1** Number of colleges participating in different components of the collection of evidence*

	Size of college				
Component	Small 1000* [N=25]	Medium 1000-1500* [N=19]	Large 1500* [N=34]	Total number of colleges [N=78]	Colleges refusing or not replying to request
A. Work activities of teachers (completion of checklist)	4	4	11	19	7
B. Interpretation and implementation of selected units	7	8	15	30	0
C. Case studies of the development and implementation of units	1	4	7	12	1
D. Questionnaire to college staff	13	10	13	36	3

Note: The sample sizes in the main component studies are given in Table 2. In selecting colleges for each component from the sample pool, care was taken to ensure as far as possible, a balance with respect to size of colleges, programmes A5, B2, C1 provided, and geographical location. In choosing the case study colleges accessibility to members of the evaluation team was also considered. The A5 programmes were represented to a greater extent than B2 and C1 programmes in the sample, and relatively few B2 and C1 programmes were offered in the small colleges.

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*Number of students expressed as Full Time Equivalents.

21. **Day-to-day work activities of teachers of TEC programmes (A).** The aim of this component was to identify what teachers of TEC programmes do as part of their work, roughly how much time they spend on different activities and how their present activities compare with those undertaken when teaching the (National Certificate) NC or CGLI courses replaced. Colleges were asked to forward the names through appropriate TEC programme co-ordinators/organisers of all full-time members of staff teaching a TEC Certificate A5, B2 and C1 programme during the autumn term 1979. (See Part 2A.) One hundred and seventy-three usable responses (64%) to a postal questionnaire and checklist activities (116 items), total response (76%) were obtained from teachers in colleges. Fifty-six of the respondents subsequently completed a one-week diary.

22. **Interpretation and implementation of selected units (B).** The aim of this component was to describe and analyse how teachers interpret selected TEC

FEU Commentary

Principal sources of evidence

A number of sources of evidence used in analysis were:

a. data from questionnaires and checklists completed by teachers about their work-activities;
b. interviews with teachers of selected TEC units, and questionnaires to students of these units;
c. case studies of the development of programmes by colleges;
d. questionnaires to teachers about the development process, their current practice, and attitudes;
e. relevant A5, B2, C1 programme submissions, TEC Circulars, Guidance Notes and statements;
f. formal and informal meetings with officers of organisations involved in the development of TEC programmes;
g. development and review conferences;
h. published articles and theses about the introduction of TEC programmes.

units and the relationship between their practices and the intentions of unit designers and validators. Five Standard units (Physical Science I, U75/004, Engineering Science II, U76/053, or U75/037, Construction Technology A, III U75/075 Manufacturing Technology III, U76/056 or U75/035, Chemistry II, U76/0[illegible]9 and General and Communications Studies were selected as the principal foci for study. One hundred and twenty-three teachers of these units were interviewed across 30 colleges in the 1979-80 academic year. Questionnaires were completed by 434 students (typically one group in each college). The visit to each college included a structured discussion with a more senior member of staff, identified as a college TEC programme co-ordinator/organiser, who was also invited to complete a questionnaire with data about college organisation and resources. (See Part 2B.) In one-day workshops two groups of six experienced teachers analysed the objectives and assessment provision for the units Construction Technology III and Manufacturing Technology III.

23. **Case studies of the curriculum development process (C).** The aim of this component was to describe and analyse in 12 colleges the process and outcome of the development of TEC programmes (both joint and single college submissions). Two approaches were adopted. One in which an external observer spent the equivalent of about 10 days in the college, and wrote an account of the development following interviews with members of staff and collection of relevant data. The second in which a member of staff of a college who took a significant role in the development, and was now, for example, Programme Co-ordinator, wrote of his experiences and a further researcher appraised the internal writer's report, following his own visits to the college. Accounts of the development of two joint-submissions were also contributed. Visits to other colleges provided further evidence of the development process.

24. Colleges were selected for case study work on the basis that firstly they were among those in the random sample pool, secondly that together they provided a balance of programme areas and joint and single college submissions, and lastly where external observers were to visit, they were geographically fairly convenient. Where quotations are taken from case study work colleges (or joint-submissions) they are referred to by code letters.

25. **Questionnaire to teachers (D).** A questionnaire to teachers was used as the final stage of data collection to consolidate information on a number of key issues, and obtain data difficult to collect in other ways. Three hundred and sixty-two usable responses (72%) were obtained to the questionnaire (number of items 133) concerned with teacher involvement in the development of programmes, and their current practices and opinion. Colleges were asked to supply lists of ALL full-time members of staff involved in teaching or administering one or more of the A5, B2 or C1 programmes. Following a trial in March 1980 questionnaires were sent in the summer term to 60% of the names received. A small number of respondents indicated they considered they were not sufficiently involved to be able to complete the questionnaire and several replies were received too late to include in the full computer analysis (total response=74%) (see Part 2D).

26. **Other sources of evidence.** Relevant A5, B2 or C1 Programme submissions of the colleges visited during our enquiries were consulted. A sub-sample of 47 Certificate programmes (A5=23, B2=10, C1=14), for which copies of the completed validation forms were available were analysed in more depth.

Three examples of 'model' or standard Certificate programmes designed and issued by the A5, B2 and C1 Programme Committees respectively and numerous TEC Circulars and Guidance Notes, were studied in an analysis of the assumptions and implications of TEC policy.

27. Evidence was also obtained through formal and informal meetings with officers of TEC, Regional Advisory Councils (RACs) and various other

organisations, and with HMIs and others with roles in the provision of technician education. Various records of meetings of groups and committees involved centrally, regionally and locally in the development of TEC programmes were consulted. A series of meetings of TEC moderators was attended, held at five centres throughout the country and the proceedings of various development and review conferences were observed and noted.

Progress working papers were discussed on four occasions by the Advisory Group. It proved necessary to limit some of the possible alternative and complementary approaches for documenting the process of programme development in accordance with the time constraints for the project.

CHAPTER 3

Teachers and Students of TEC Programmes

Qualifications and experience

Attitudes of teachers towards the new TEC programmes

The students of TEC programmes

The teachers of TEC programmes

Qualifications and experience

28. Three components (A, B and D – see paragraphs 21, 22 and 25) of the enquiry collected data independently, but within the overall framework, about the qualifications and experience of the teachers. Components A and D provided quantitative data; component B afforded data for teachers of selected TEC units, but in some cases it was not always possible, during interviews, to collect information for the whole sample. Thus evidence is available on the distribution of teachers in the sample with respect to their level of appointment, age, qualifications, experience in further education and in industry, experience of teaching CGLI/NC technician courses, the date of first involvement in any activities concerned with a TEC programme or its teaching, and the proportion of their work allocated to TEC programmes. It has been possible to compare the characteristics of teachers in this sample with similar recently published data from a large scale survey (3,372 teachers) of careers in FE teaching (Bradley and Silverleaf, 1979). Extensive use has been made of this NFER project publication in the paragraphs (29–32 below.

29. **Level (grade) of appointment.** The distribution by level of appointment of teachers responding in components A and D is shown in Table 2. The following variations from the NFER data are noted. The proportion of teachers of TEC programmes holding Lecturer I posts, responding to this study (component A 23%, D 25%) is lower than the proportion of Lecturer Is for the profession as a whole (32%). Set against this the proportion of Lecturer IIs (A 35%, D 30%) is rather greater than in the profession as a whole (28%). In visits by members of the evaluation team to colleges to meet teachers of specific units (component B), there was a high proportion of Lecturer IIs teaching the units in question (Lecturer Is 20%, Lecturer IIs 48%, Senior Lecturers 29% (N=100)). This is attributable in part to their relatively greater involvement compared with Lecturer Is in the teaching of units at level III (eg Manufacturing Technology Level III, Construction Technology Level III).

30. **Age.** More than 70% of the total sample of teachers of TEC programmes are over 40 years of age. Figure 4 shows the age distributions which were similar in the three independent samples. The average age is slightly above that of the FE teaching profession as a whole. Teachers of General and Communication Studies are younger than their technical colleagues, only 45% being over 40 years of age.

31. **Years of teaching experience in Further Education.** Almost 70% of the teachers (in both components A and D) have taught full time in FE for more than 10 years and 50% for over 15 years (Table 3). General and

Table 2 *Level of appointment – distribution of teachers (data from components A and D)*

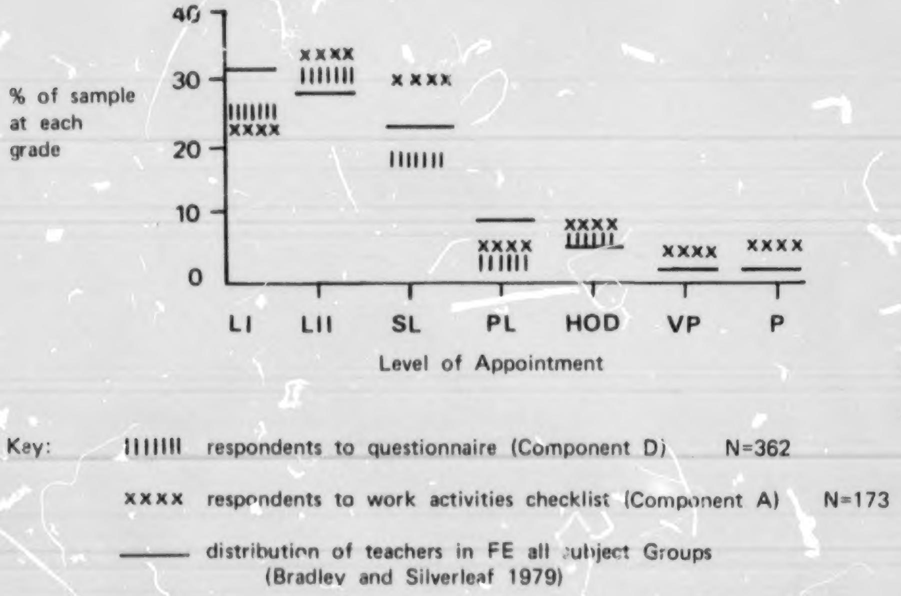
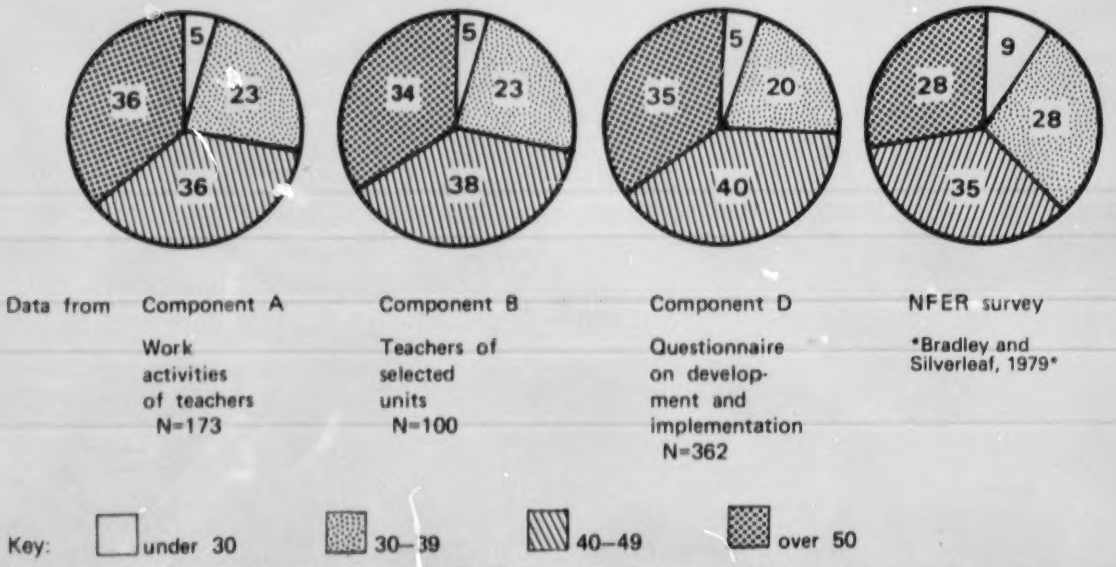


Table 3 *Years of teaching experience in Further Education – Distribution of responses (as % of total – all subject areas)*

Data from	Years of experience			
	1-2	3-5	6-10	over 10
Component A Work activities of teachers (N=173)	2	7	22	69
Component D Questionnaire on development and implementation (N=362)	9	5	16	69

Figure 4 *Age distribution of teachers responding (as % of total – all subject areas)*



FEU Commentary

Teachers' qualifications and experience

About two-thirds of the teachers in the sample possessed a Certificate or Diploma in Education, a relatively high proportion compared with FE teachers generally. However some respondents may be holders of CGLI teachers' certificates and therefore are not recognised as qualified teachers by the Department of Education and Science.

Communication Studies teachers differed markedly from their technical colleagues; being younger, only 39% had taught for more than 10 years and 22% had taught for less than 6 years.

32. **Qualifications.** Overall the pattern of qualifications amongst respondents is broadly similar to that amongst members of the profession as a whole, with one exception. A greater proportion of teachers of the Mechanical Engineering A5 (44%) and Building Studies B2 (34%) programmes hold Higher National Certificate and Higher Diploma awards than do teachers in FE as a whole (21%) (Table 4). About half of the sampled population are graduates and a quarter possess post-graduate qualifications. Almost two-thirds of the teachers of TEC programmes in this study hold a Certificate or Diploma of Education, which is much greater than for all teachers of colleges of further education (46%).

Table 4 *Qualifications of responding teachers of TEC programmes (Categorised by Programme/Subject area and as expressed as percentages)*

TEC Programme/ Subject area		Post graduates	Graduates	Non graduates with HNC/HND	Professional qualifications	Certificate in education
A5	N=223	15	42	44	48	69
B2	N= 56	43	51	34	54	58
C1	N= 70	45	74	11	44	60
G+CS[b]	N= 22[A]		89	6		83
G+CS	N= 43[D]	34	93	0	23	82
All subject areas	N=173[A]		50	35		66[c]
	N=362[D]	22	50	36	48	65[d]
Comparative data[a] from NFER survey N=2450		13	45	21	46	46

[a] Data for colleges of further education – all subject areas.
[b] G+CS=General and Communication Studies.
[c] Certificate in Education (PGCE or equivalent).
[d] Certificate or Diploma of Education.
[A] Respondents to Component A.
[D] Respondents to Component D.

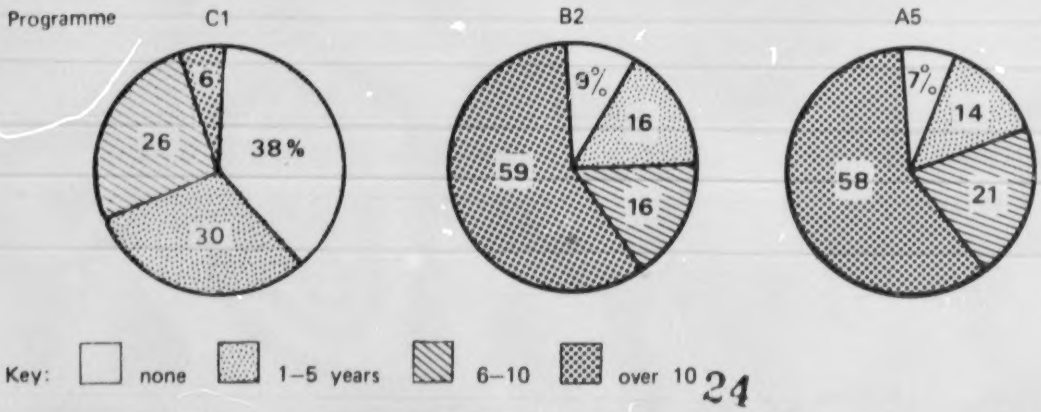


Figure 5 *Years of industrial experience – Distribution of teachers' responses, categorised by programme*

FEU Commentary

The teachers of technical units in General Mechanical Engineering (A5), and Building Studies (B2), programmes have substantial industrial experience although for half of these this dates from 15 years ago. In contrast the industrial experience of teachers of Science (C1) programmes was much less and a substantial number have no industrial experience.

Whether teachers find themselves teaching new technology and skills may depend very much upon their existing specialisms, but in general the dated and limited industrial experience of many of them indicates that the problems of updating technical knowledge and skills should be a major priority of staff development programmes (see paragraph 301).

Most of the teachers have experience of teaching either CGLI and/or National Certificate technician courses replaced by the new TEC programmes.

For many teachers less than half of their work is assigned to TEC programmes.

33. **Industrial experience.** Almost 60% of the teachers of A5 and B2 programmes have worked in industry for over 10 years, and less than 10% have not worked in industry at all. In contrast, significantly few teachers of C1 programmes (6%) have worked in industry over 10 years and almost 40% have no industrial experience (Figure 5).

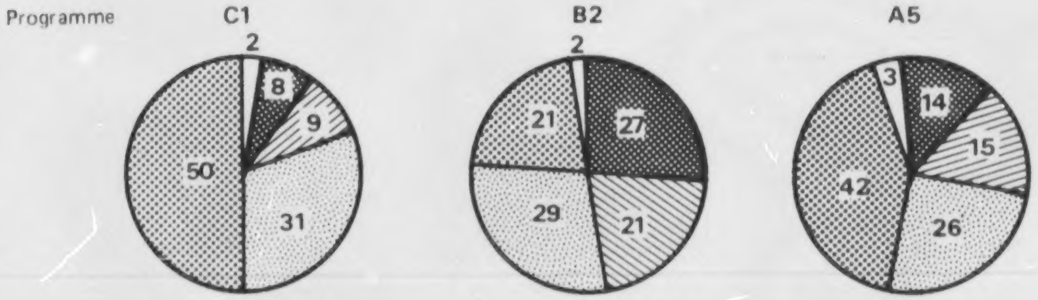
34. **Experience of teaching CGLI and/or National Certificate/Diploma Courses.** Most of the teachers of A5 (91%), B2 (73%) and C1 (85%) have taught, for at least three years, the CGLI and/or NC/ND courses replaced by TEC programmes (Table 5). The proportion of teachers of courses leading to both awards falls markedly from teachers of A5 programmes (59%), B2 (48%), to C1 programmes (31%). This reflects the relative extent of the corresponding previous provision of CGLI and NC/ND programmes.

Table 5 *Experience of teaching CGLI and/or National Certificate technician courses*

	% of teachers responding with more than 3 years' experience		
Previous course taught	C1 N=70	B2 N=56	A5 N=223
CGLI only	13	2	22
NC/ND only	41	23	10
Both CGLI and NC/ND	31	48	59

35. **Proportion of teachers' work allocated to TEC programmes.** For many teachers of TEC programmes C1 (50%), A5 (42%) and B2 (20%), the proportion of their work allocated to TEC programmes is less than a half of their total commitment (Figure 6).

Figure 6 *Proportion of teachers' total work allocated to TEC programmes – responses categorised by programme (N=362)*



Note Comparably similar data across all subject areas from component A, N=173, and component D, N=362 showed the following proportions – almost all, A 12%, D 14%; about ¾, A 16%, D 14%; about ½, A 31%, D 26%; about ¼ or less, A 42%, D 41%; none, A 0%, D 4% – the difference in the latter two figures being due to the fact that component D included Vice Principals and Principals.

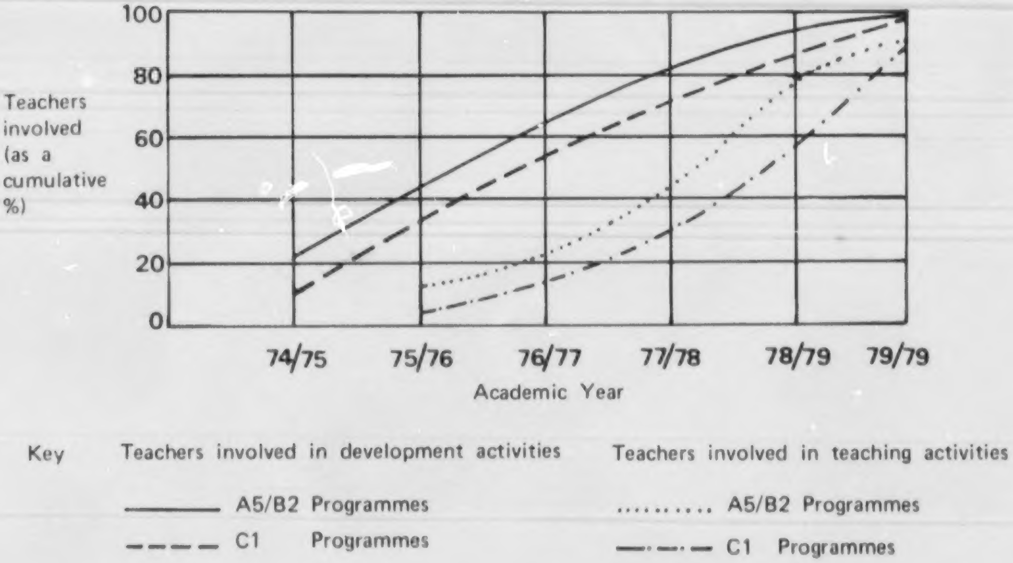
Key: ☐ none ▩ about ¼ or less ░ about ½ ▧ about ¾ ▦ almost all

FEU Commentary

Generally there was a two year period between teachers' first involvement of any kind in the development and teaching of a programme, during which the college preparation of the programme and subsequent validation by TEC took place.

36. **First involvement in TEC activities and TEC teaching.** Figure 7 shows a measure of the increasing numbers of teachers involved in TEC programmes (in the sample) during the period 1974-80. About half of the teachers now teaching A5 and B2 programmes were first involved in their development in the 1975-76 session, whereas about half of the teachers now teaching C1 programmes were first involved in the 1976-77 session. Generally there appears to be about a two year gap between the proportion of teachers 'involved in any (developmental) activities concerned with the introduction of TEC programmes' and the same proportion 'teaching part of the TEC programme'. The proportion of the sample involved in development activities but not in teaching is about 12%. These are mainly Principals and Vice-Principals and some Heads of Department.

***Figure 7** Teachers in the sample involved in the development and teaching of TEC programmes since 1974 – (expressed as a cumulative %) N=362*



Attitudes of teachers

Since it is still early days in the development of TEC programmes it is not surprising that a substantial number of teachers did not wish to make other than a neutral response to definitive questions about the effectiveness of the new provision in achieving aspects of TEC policies.

However whereas the balance of responses with respect to industrial and student needs was slightly favourable, teachers, with the exception of those of the B2 programmes, had greater doubt as to whether the new programmes are 'increasing the student's capacity to learn', 'to adapt to new situations' or developing the student's responsibility. Whilst this data must be interpreted cautiously it is consistent with

Attitudes of teachers towards the new TEC programmes

37. In any discussion on teachers' attitudes it must be recognised that these depend on many factors such as the resources available to them, and changes in their knowledge and skills which may not be specifically related to TEC development.

38. **Effectiveness of the new provision in achieving TEC policies.** Teachers were asked to indicate their agreement or disagreement with a number of statements, generally explicit in the TEC Policy Statement, as part of the evidence collected to contribute to an understanding of the effect of TEC provision. Responses categorised by programme area are given in Table 6. The responses should be recognised as no more than their opinion after typically two or three years' experience of teaching or organising the new programmes. At this relatively early stage of TEC developments substantial numbers of teachers (about 30-40%, depending on the item) wished to express neither agreement nor disagreement, and any reading of the following analysis must take this into account. An index of the extent to which teachers agree that some intended outcomes of TEC policy (TEC Policy Statement) are being realised is given in Table 7. It is a measure of the difference between the numbers agreeing and disagreeing (see footnote, Table 7). Thus a high positive value reflects a balance of opinion which can be regarded as very favourable, a negative value as unfavourable.

FEU Commentary

the views of technicians themselves about their experience of college technician courses as reported by Clements and Roberts (1980). These technicians perceived that the FE provision actually hinders the development of 'self confidence, adaptability, critical ability, or independence of thought'. They considered that such attributes are learnt through work experience.

The teachers of the technical units A5 programmes appear to hold the least favourable views about the introduction of TEC programmes. A higher proportion of these respondents were from smaller colleges, compared with the teachers of B2 and C1 programmes.

Responses depended upon the teachers' subject area. The more favourable responses of the teachers of General and Communications Studies support the thesis that TEC has had an acceptable beneficial effect on this area of the curriculum, these teachers now working within the same curriculum framework as those of the technical curriculum.

Table 6 *Teachers' opinion about the new TEC programmes, categorised by programme area*

	C1		B2		A5	
The new TEC programme:	Agree or strongly agree (%)	Disagree or strongly disagree (%)	Agree or strongly agree (%)	Disagree or strongly disagree (%)	Agree or strongly agree (%)	Disagree or strongly disagree (%)
is meeting industrial needs	34	17	39	18	34	20
is meeting student needs	46	19	48	25	37	26
is increasing the student's capacity to learn	22	40	30	32	25	42
is increasing the student's capacity to adapt to new situations	29	33	34	20	31	30
is increasing the student's capacity to communicate successfully with others	32	32	43	16	35	22
is developing the student's responsibility	33	34	30	18	27	31
represents an overall improvement in the quality of educational provision for the student technician	28	47	45	25	30	45
has assessment processes which are effective in measuring whether or not students achieve the programme objectives	64	15	62	13	51	23

39. Whilst, in total, rather more teachers indicated that they believed the new TEC programmes are meeting student and industrial needs than those who disagreed, the distribution of responses is notable, less senior members of staff (SLs, LIIs and LIs) holding less favourable views. The balance of responses did not indicate that the teachers believe the new TEC programme 'is increasing the students' capacity to learn', and opinion was roughly equally divided about the aims 'to adapt to new situations', and 'to develop the students' responsibility'.

40. More teachers of the Building Studies B2 (43%) and Mechanical Engineering A5 (35%) programmes agreed that the programme is increasing the students' capacity to communicate successfully with others than those who disagreed (17 and 21% respectively). Opinion of teachers of C1 programmes was equally divided.

41. Whereas more teachers of C1 (47%) and A5 (45%) programmes disagreed that the new programmes 'represent an overall improvement in the quality of provision' than those who agreed (28 and 30% respectively) the opposite situation prevailed in the case of B2 programmes, 45% of respondents viewing the situation favourably (and 27% neutrally disposed).

42. Further analysis of responses shows that for single college submissions more of the teachers of programmes (including those in which some collaboration occurred with other colleges) agreed that the TEC programme

'is meeting industrial needs' than those who disagreed. This compared with more evenly divided opinion held by teachers of joint-submissions. Consistent with this are teachers' comments that a disadvantage of joint submissions is that they lead to compromise which is not in the interests of local industry.

Table 7 *An index of the extent to which teachers agree that some intended outcomes of TEC programmes are being realised; responses categorised by level of appointment*

Intended outcome (descriptor)	Index of agreement with the descriptor*							% of total respondents expressing neither agreement nor disagreement
The new TEC programme:	P	VP	HOD	PL	SL	LII	LI	
is meeting industrial needs	3	6	6	4	1	1	0	33
is meeting student needs	4	7	5	6	0	−1	−1	32
is increasing the student's capacity to learn	1	3	−1	−1	−2	−2	−1	32
is increasing the student's capacity to adapt to new situations	2	4	1	1	1	−1	1	37
is increasing the student's capacity to communicate successfully with others	4	5	3	0	−2	2	1	40
is developing the student's responsibility	1	4	−1	1	0	0	0	40
represents an overall improvement in the quality of educational provision for the student technician	0	5	1	5	−2	−2	−1	24
has assessment processes which are effective in measuring whether or not students achieve the programme objectives	5	5	5	6	3	3	5	23

$$^{*}\text{ Index} = \frac{\%\text{ (Strongly Agree+Agree)} - \%\text{ (Disagree+Strongly Disagree)}}{10}$$

Note: An index of 10 would mean all teachers strongly agree or agree with the descriptor; an index of −10 would mean all teachers disagree or strongly disagree with the descriptor.

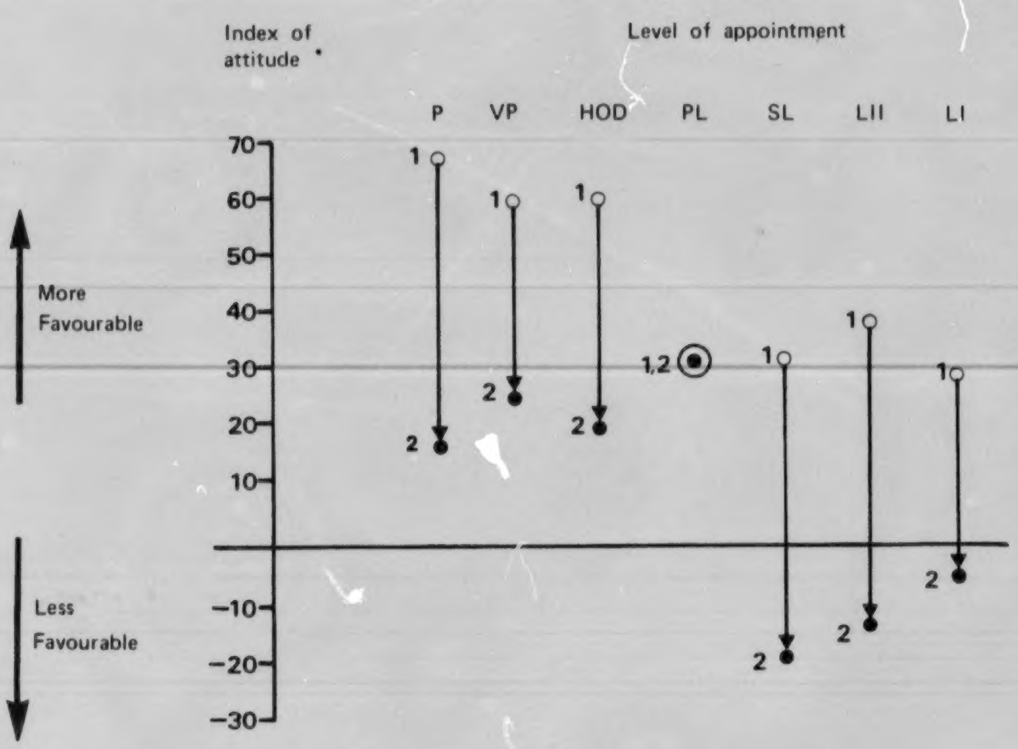
General attitude of teachers

43. The general attitude of teachers (as expressed in questionnaire responses). Many teachers (51%) indicated that initially their attitude to the introduction of TEC programmes was 'very favourable' (15%) or 'favourable' (35%). However 'now after some experience' fewer of all respondents (36%) are so disposed and a greater number (40%) view the situation unfavourably.

An index of the change in general attitude of teachers, categorised by their level of appointment was calculated by subtracting the percentage of teachers making unfavourable responses from the percentage making favourable responses (Table 8). This shows a similar directional change of attitude of teachers of all grades (with the exception of the small number of Principal Lecturers in the sample), but a marked difference in grouping of the attitudes of staff with more senior (P, VP, HODs) and less senior (SL, LI, LII) appointments. The responses show the Senior Lecturers, probably the staff with the most heavy work commitments to TEC programmes in a mixture of organisational and teaching roles to be least favourably disposed.

Resistance to major innovation is to be expected. Change is threatening. Watson (1967) identifies eight forces of resistance to change amongst which are man's desire to maintain balance (homeostasis), to prefer the familiar, to maintain solidarity with his peers. It is perhaps surprising therefore that many teachers indicated (in our survey in 1980) that initially, typically some three to five years earlier depending on programme area that they were

Table 8 *An index of the CHANGE in the general attitude of teachers towards the introduction of the new TEC programmes, from (1) 'initially, when the idea was introduced' to (2) 'now after some experience'. Responses categorised by level of appointment.*



* Index of attitude = % (teachers responding very favourable + favourable) − % (teachers responding unfavourable + very unfavourable)

1 opinion now, of attitude held 'initially when the idea was introduced'
2 opinion 'now after some experience'
→ measure of change in attitude.

Note:

Overall sample (a) neutral response, 'initially' (1) = 31%, 'now' (2) = 21%
(b) non respondents, 'initially' = 3%, 'now' = 4%.

P = Principal (N=17), VP = Vice Principal (23), HOD = Head of Department (33), PL = Principal Lecturer (10), SL = Senior Lecturer (65), LII = Lecturer II (110), LI = Lecturer I (90).

Data collected : Summer 1980

favourably disposed towards the introduction of TEC programmes. Since in our initial enquiries in 1978 we received considerable critical comment about various aspects of TEC which teachers found unsatisfactory it is likely that with the passage of time they do not accurately recall their earlier perceptions. On the other hand teachers indicated at the earlier date that it was the

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practices consequent upon TEC policies which caused dissatisfaction rather than the educational policies themselves.

Perhaps the most important observation from this data is the apparent difference in response between teachers at the more senior levels of appointment (Principal, Vice-Principal, Head of Department) and their colleagues (Senior Lecturers, Lecturer II, Lecturer I). The latter group who were less favourably disposed are those involved with the day-to-day implementation of TEC in the classroom and with the associated tasks of the assessment process which forms a major part of their work (paragraph 199). This is a greater proportion of their work than in the case of the more senior staff and the responses reflect the often voiced concerns of the pressures of the new TEC programmes for the classroom teacher.

Understanding the attitudes of teachers

Those who seek to bring about curriculum change require an understanding of the contextual factors and institutional climates in which the changes are to take place. In particular the disposition of teachers as individuals and as groups with particular loyalties, must be recognised. At times the expectations of what can be accomplished on short time-scales and with minimal allocation of resources appear to be unrealistic. The case studies in this work provide illustrations of some of the factors which have caused teachers of TEC programmes to voice criticism about the demands being made upon them.

The allegiance of teachers to an existing provision must not be underestimated. No feeling of dissatisfaction with the existing situation is a barrier to change. For example many teachers had no basis on which to feel that a major change in the nature of course specification and assessment was necessary. Such changes not un-

44. Categorisation of the (1980) responses by teachers' subject area and similar indexation to that described in paragraph 43 shows teachers of General and Communication Studies were the most favourably disposed and those of the scientific and technical studies of the A5 programme to be the least favourably disposed (Table 9).

45. In the component study on work activities teachers who completed, in December 1979, checklists of their work activities and accompanying questions believed that the introduction of TEC programmes made either 'a lot of sense' (20%) or 'a fair amount of sense' (45%) and that on the whole the introduction had either been 'most successful' (10%) or 'fairly successful' (54%). Invited to complete a sentence beginning 'I feel sure I could do a better job as a teacher on TEC Certificate programme if only . . .' there was a balance between comments which seemed to be arguing in favour of a greater freedom and flexibility in approach and those which called for greater prescription (Part 2A).

Teachers' attitudes to the changes required

46. Some of the feelings of teachers as reported through the case studies are illustrated below. They are arranged under headings which categorise their typical concerns.

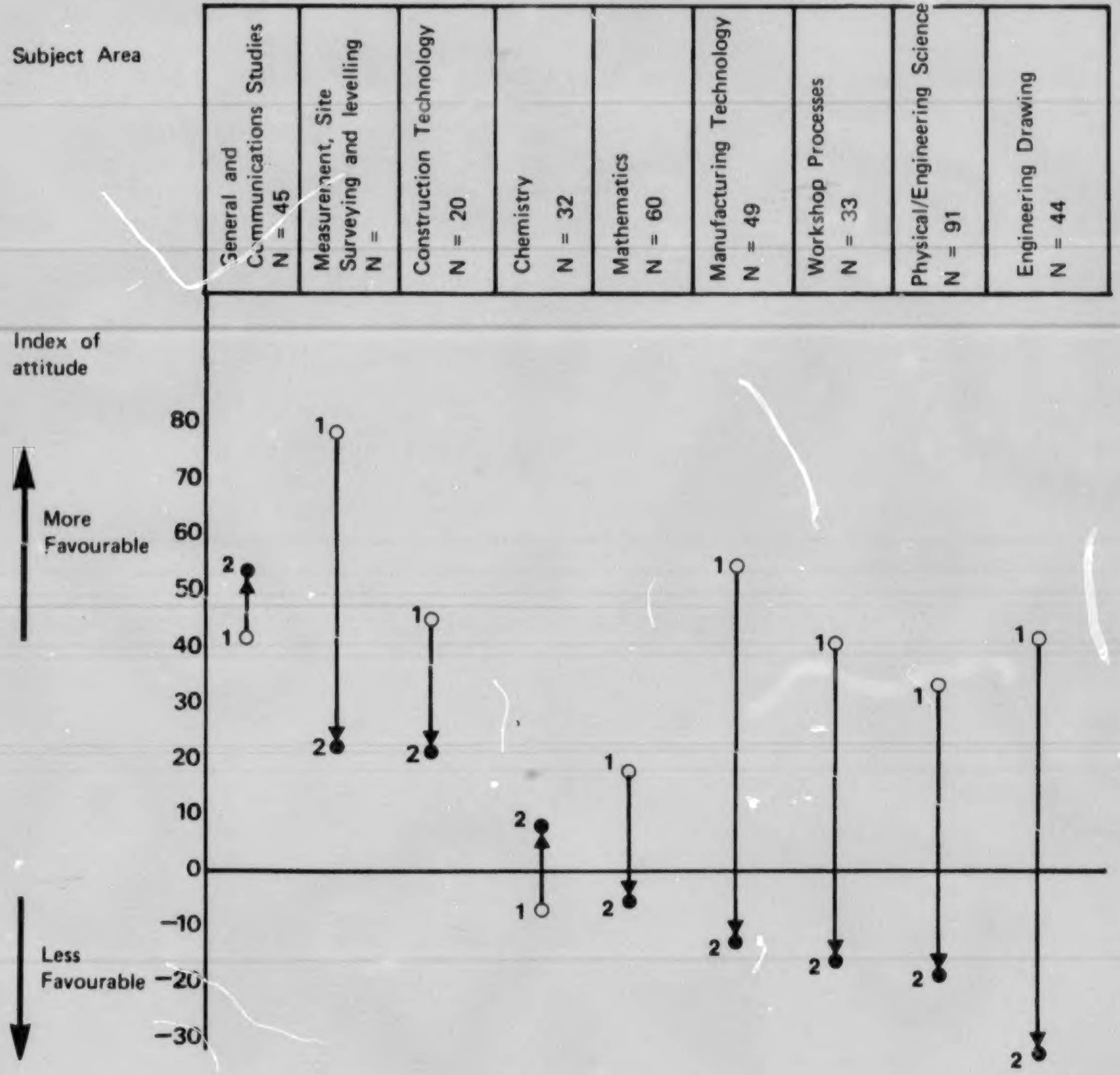
47. Allegiance to previous course structures. *'We felt that what was a satisfactory course was being replaced by something that was no better, and a hell of a lot of work was really unnecessary to meet an end which sounded good "Technician Education", and the more we did the more we realised that there was no way the esoteric objectives of TEC were ever going to work.'*

'All contributors to the original submissions continue to hold reservations based upon allegiance to previous course structures and practices and they await to see the proving of the unit system rather than the course system'. (Case study writer of an A5 programme).

48. A belief that the proposed changes were unnecessary. *'Staff reacted strongly to TEC's innovatory proposals for technician courses with the consensus opinion that such severely radical rationalisation or change to the existing science provision was not really needed. While recognising the need for technician education to be given a "spring clean" they considered that suitable modification of existing courses would be change enough. In other words there was nothing wrong with ONC courses or City and Guilds Technician Courses in Science apart perhaps from their disparate populations, so why change a system which worked and more importantly perhaps was understood by educationalists, students and employers'. (C1, programme co-ordinator.)*

49. Concern about standards. *'TEC is a virtually non-fail course, it will reduce standards . . . how does the moderator know whether standards are the same at another college . . . I am not sure my students are ok, they might fail at another college'. (Lecturer, A5 Programme.)*

***Table 9** An index of the CHANGE in the general attitude of teachers in the introduction of the new TEC programmes from (1) 'initially, when the idea was introduced' to (2) 'now after some experience'. Responses categorised by subject area.*



Key

* Index of attitude = % (teachers responding very favourable + favourable)− % (teachers responding unfavourable + very unfavourable)

1 opinion now, of attitude held 'initially when the idea was introduced'
2 opinion 'now after some experience'
→ measure of change in attitude.

Note: overall the sample (N=362)
(a) neutral response, 'initially' (1) = 31%, 'now' (2) = 21%
(b) non respondents, 'initially' (1) = 3%, 'now' (2) = 4%

Data collected: Summer 1980

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naturally gave rise to anxiety about the standards of an unknown system. Teachers discovered either in the programme design or implementation stages that TEC programmes meant change in the tasks they would be required to undertake. Innovation means effort is required in new directions and without accompanying resources the inevitability, at least in the short term of additional work. Change also means an increase in uncertainty for those involved. Lack of available evidence or reports of the soundness of the new proposals contributed to accompanying anxiety. In fact evidence that new curricula and detailed assessment plans were being prepared on short time scales contributed to doubts about the adequacy of the new programmes as a replacement of the known courses.

Changes in individual teacher attitudes can be expected to take place as part of a continuing process rather than suddenly. Individuals become aware of, take interest in and get involved at different rates. Few are 'innovators', some are 'early adopters' others 'late adopters' and some 'resistors' or, to use the term from innovation theory, 'laggards' (Havelock, 1973).

50. **Reluctance to adopt new ideas.** *'The general attitude to the introduction of the scheme has been to regard it as an unasked for and unwelcome imposition by a remote bureaucracy, which has no interest in recognising or understanding their problems. Having drawn those conclusions they act accordingly. Every stage in the erosion of their conditions of service (which have been real enough) they have stubbornly resisted and yielded only begrudgingly. They sincerely believe that they are paid to prepare teaching materials, teach and conduct assessments as and when necessary. It is interesting to recall that virtually all of the staff tackled the preparation of teaching materials with enthusiasm. There was no argument about this being part of their job, recognised as such by general consensus. The actual teaching is equally enthusiastically dealt with but is still clearly defined as part of their responsibilities. The reluctance to accept new or even different duties seems to develop from a collective opinion of what is acceptable and what is not. It seems silly to speak of rigid lines of demarcation among professional people, but they are real enough, and the departmental management is very aware of them. Ultimately the work gets done, but if it is seen as being beyond the usual frame of reference, especially if it is an administrative chore it will be allocated a low priority and left to the last minute. The one factor which tends to overrule all others is loyalty to the students and it is this that eventually prompts some action'. (B2 Programme Co-ordinator.)*

51. **Extra work without resources.** *'Initially most of the staff made a substantial if reluctant effort to cope. However people cannot and will not sustain extraordinary effort and commitment without adequate recognition and resources'. (B2 Programme Co-ordinator.)*

52. **Uncertainty and anxiety inherent in change.** *'When we asked how many retests should we do we got no answers . . . when do we retest? . . . how often do we retest?'. (Lecturer, A5 Programme.)*

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Students of TEC programmes – qualifications on entry

This study is essentially focused on the activities and experiences of teachers in colleges and the development of the curriculum, the equally important attitudes of employers and students and the progress of the latter being the agreed focus of the complementary NFER study. However data on student experiences of the new curricula was collected, although on a limited scale, in order to assist the interpretation of the impact of the curriculum on the colleges. Student viewpoints are of fundamental importance since it is for them that the curriculum is designed.

A high proportion of the students in the sample possessed 'O' levels or CSEs at grade 1 which would normally have given them entry to the former National Certificate courses. The percentage of 67% with four or more 'O' level or 'O' level equivalent passes may be compared with the figures of 62% (Science), 42% (Building Studies) and 38% (Mechanical and Production Engineering) for the population of 1,064 students in the larger NFER sample. (Moor et al, 1981.) The percentage of students without any 'O' level grades is rather smaller than the comparable figure of 10% in the NFER data. Whilst the overall distribution reflects the wide ability range of students of TEC Certificate programmes this opportunity sample appears skewed towards students of higher entry qualifications compared with the NFER sample.

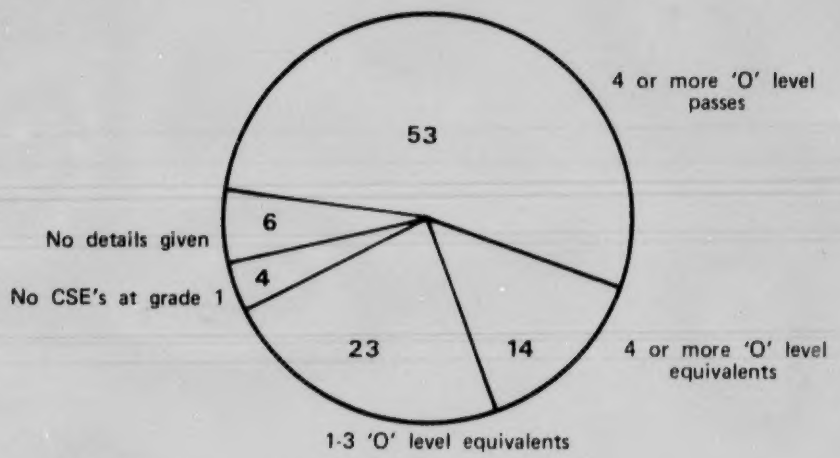
The students of TEC programmes

53. The characteristics, achievements and attitudes of students of TEC programmes form a major part of the concern of the complementary evaluation study being undertaken by the NFER (paragraph 7). Data collected was limited therefore to ascertaining the teaching and learning methods experienced by students in those colleges visited in the component of the study concerned with the interpretation of units (paragraph 22).

'O' level and 'CSE' achievements

54. The 'O' level and/or 'CSE' achievements of 430 students, distributed amongst 28 colleges in the opportunity sample (ie those students in a class available at the time of the visit of a member of the evaluation team) are shown in Figure 8.

Figure 8 *Distribution of 'O' level and/or 'CSE' achievements of students of TEC programmes (as % of total respondents N=430)*



(Note: 'O' level equivalents = 'O' level or CSE at grade 1)

Over 50% of the sample held four or more passes at 'O' level and together with a further 14% who had passes at CSE grade 1 in lieu of any 'O' level pass would have probably been a student of National Certificate courses in the previous provision. Almost a quarter had one to three 'O' levels or CSEs at grade 1. Very few (4%) had no CSEs at grade 1.

Some attitudes of students of TEC programmes

55. Students were asked to make responses to multiple choice questions, with reference to a specific unit.

Many (69%) replied that their degree of preparedness for the work of the unit was 'just right' whereas 17% felt 'under-prepared' and 7% 'over-prepared'.* Over half the respondents (54%) found the units 'quite interesting' and a further 25% found them 'very interesting', 13% indicating the units were 'not at all interesting'.*

Student responses on teaching and learning methods are given in paragraphs 82 to 84 and 86.

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* Remaining percentage accounted for by small number of non-respondents to this question.

CHAPTER 4

Curriculum Issues

Learning objectives

Teaching and learning methods

Subject matter

The assessment of learning

Specification of the curriculum

This chapter discusses the implications of the learning objectives approach advocated by TEC, the teaching and learning methods in use, and the practices in the approach to assessment in response to TEC policies. Briefly some consequences of TEC on the subject matter of the curriculum are illustrated, a study of the structure of knowledge and skills within the various disciplines, eg mechanical engineering, mathematics, chemistry of TEC units lying outside the scope of this work. The chapter concludes by arguing that curriculum development must consider the interaction and balance between the above curriculum elements at the design stage. The curriculum statement should include examples of teaching and learning activities considered appropriate by unit designers.

Learning objectives

The specification of objectives

56. **TEC policy on objectives.** The TEC Policy Statement (4.3.4) states that the 'Programme Committees providing materials for the use of colleges will decide whether to issue draft syllabuses or to provide guidelines in a different form, for example, as a statement of learning objectives'. In Circular TEC 6/75 the Council declared its aim 'that in due course all units should be written in the form of general and specific learning objectives'. In the same circular the Council expressed recognition that 'writing unit content in the form of objectives could in the short term result in substantial demands being made on staffing resources of colleges. Indeed some colleges may not have teaching staff with appropriate experience in the writing of learning objectives. In such cases some staff development and in-service training will be necessary'.

57. The style of objectives advocated and adopted in TEC Standard units was the subject of TEC Guidance Note No. 1, dated February 1976. In these notes an educational objective is defined as 'a precise statement of intent, describing some proposed change in a learner. Anybody reading a list of objectives should be able to decide what behaviour, the performance, of a student should be on completing the list of objectives'. A distinction is made between general objectives and specific objectives. 'General objectives are used to give the general teaching goals, the major purpose of a unit, and the specific objectives the means by which it can be determined whether the general objectives have been attained. The specific objectives should be sufficiently clear and precise that little if any ambiguity exists in both the description and assessment. The general objectives are not in themselves specific enough to give an adequate description or avoid ambiguity in interpretation for assessment.'

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The specification of learning objectives

TEC policy has given particular emphasis to the specification of aims and objectives and assessment methods as key elements of curriculum design. The model programmes issued by TEC Programme Committees and the Standard units have a set of AIM STATEMENTS. Each unit states both GENERAL OBJECTIVES and SPECIFIC OBJECTIVES, and has an associated analytical assessment specification.

The programme and unit AIMS are the most generalised statements of educational intent, concerned with ultimate outcomes. The GENERAL OBJECTIVES express more precise intentions for a component of a unit. For each general objective a number of SPECIFIC OBJECTIVES are to be written in behavioural terms, in such a way that it should be clear what the student of the objective will be able to do on completion of the necessary learning. Since on the one hand there is clear distinction in the use of these terms in TEC curriculum documentation, and on the other hand there is no universal agreement as to the most appropriate usage of these and similar terms in the specification of curriculum intentions, little would be gained by discussion of possible alternatives (eg use of the term 'GOALS' rather than general objectives as proposed by Heathcote, Kempa and Roberts, 1980). Of greater importance is for the designers and users of the curriculum framework to share as common an understanding as possible of the terms employed.

TEC Guidance Notes No. 1 require specific objectives to be written in a behavioural format, defined by a content and a learning performance with constraints limiting the requirements. The mode is similar to but not as rigorous as that proposed by Gagné (1974) nor as fully stated as advocated by Mager (1962). The distinction between general and specific objectives follows that of Gronlund (1970, 1976).

There has been much discussion by curriculum theorists and practitioners about the merits of specifying objectives especially behavioural objectives, similar to those advocated for specific objectives in TEC units. (For example, MacDonald-Ross, 1973; Hirst, 1969.) MacRory (1976) discusses the limitations of the behavioural objective approach as the basis for curriculum design in 'A Critique of TEC Guidelines for Curriculum Change'.

Objectives – advantages and limitations

The main arguments advanced by TEC for basing curriculum design on a specification of general and specific learning objectives are that their use should greatly enhance the understanding of the curriculum by employers, teachers and students, and also provide a basis which allows standards to be determined and monitored by the Council through its validating committees and moderators. Essentially these perceived advantages are concerned with ensuring clear communication between curriculum providers and users.

Advantages which other protagonists of behavioural objectives have claimed include: objectives enable rational planning of curricula, en-

58. In the standardised approach to objective writing adopted by TEC all objectives should have certain components:

'a. a verb indicating the LEARNING PERFORMANCE required, eg defines;
b. AN OBJECT the thing that has to be learnt, eg stress;
c. CONSTRAINTS, within which the objective is to be realised.'

In this example 'the constraint is that the definition is only to be as force/area'.

59. TEC envisaged advantages to be gained by adopting the format of general and specific learning objectives (Circular TEC 6/75). Their use should enable 'EMPLOYERS to obtain a greater understanding and awareness of what is intended to be achieved as a result of each unit, TEACHERS (to) find (them) of greater assistance in appreciating the depth for each topic, STUDENTS to obtain an awareness not only of what is required of them during the assessment of their performance, THE (TEC) PROGRAMME COMMITTEE which should find it easier to appreciate the depth of treatment proposed for each topic and to be able to gauge whether or not it meets the Committee's requirement for validation, THOSE RESPONSIBLE FOR ASSESSING THE STUDENT'S PERFORMANCE who will have detailed and unambiguous information on which to base their schemes of assessment'.

courage thinking, make otherwise concealed values explicit and provide a basis for individual learning programmes. To set against the advantages there are limitations to which TEC did not refer in its policy circulars or guidance notes. These include: objectives do not adequately represent the structure of knowledge, are inherently ambiguous, with insoluble levels of specificity, they inhibit achievement of unanticipated outcomes, and imply a limited model of student-teacher interaction. It is well known that it is much easier to write objectives which are relatively trivial with an accompanying risk, therefore, that more significant objectives are underemphasised.

Whilst the use of behavioural, and near-behavioural objectives are of value for expressing those skills which developers of technical curricula can justify for inclusion in the curriculum, their limitations should be fully understood. Objectives can only communicate known intentions. It is likely that there will be new and emerging practices and skills which curriculum designers may not be able to verbalise as objectives, or which may arise during implementation of the curriculum and prove impossible to anticipate.

Limitations of the modified Bloom taxonomy

Bloom's taxonomy of educational objectives has greatly influenced the decisions of curriculum designers since its publication in 1956. Its usefulness in causing curriculum planners to think of a whole possible range of objectives must be beyond doubt, yet at the same time its adoption, and particularly in a modified form, requires caution to ensure it assists rather than dominates the design and implementation of the curriculum. There may be alternative structures to be found. The potential limitations have been discussed in the curriculum literature (eg McDonald Ross, 1973).

The categorisation of objectives into the three domains, Psychomotor (physical skills), Affective (emotion-

60. **The categorisation of objectives.** The TEC Guidance Notes state further that 'as a basis for assessment and an aid to validation, objectives have been considered as falling into three categories related to the form of learning involved. These categories are commonly identified as: a. Psychomotor domain – the student's ability to execute some job, physically to do some task; b. Affective domain – the way in which a student responds, adopts attitudes, develops values; c. Cognitive domain – the intellectual processes presumed to be involved in tasks requiring thinking'.

61. 'In Standard units the cognitive domain has been further divided to give a graduation from a lower to a higher level of intellectual skills. The adopted sequence is:

a. Information – the lower intellectual skill involving the ability to recall or recognise previously learned material;
b. Comprehension – the ability to grasp the meaning of material;
c. Application – the ability to bring a number of ideas together and use or apply them in an unfamiliar situation;
d. Invention – the skills of analysis, synthesis, evaluation.'

This division is an adaptation of Bloom's taxonomy, Bloom 1956, the category Invention comprising the three Bloom levels of Analysis, Synthesis, and Evaluation.

In describing this categorisation TEC drew attention to a previous use of the term Invention (Wood and Skurnik, 1969), and to a 'four level' hierarchy, Knowledge, Comprehension, Application and Evaluation used by the Joint Matriculation Board in GCE assessments.

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al) and Cognitive (intellectual) whilst commonly practised gives rise to a ready misconception that learning and performance in each of these areas can be separated. In practical educational situations this distinction is a highly artificial one (Lawton, 1973).

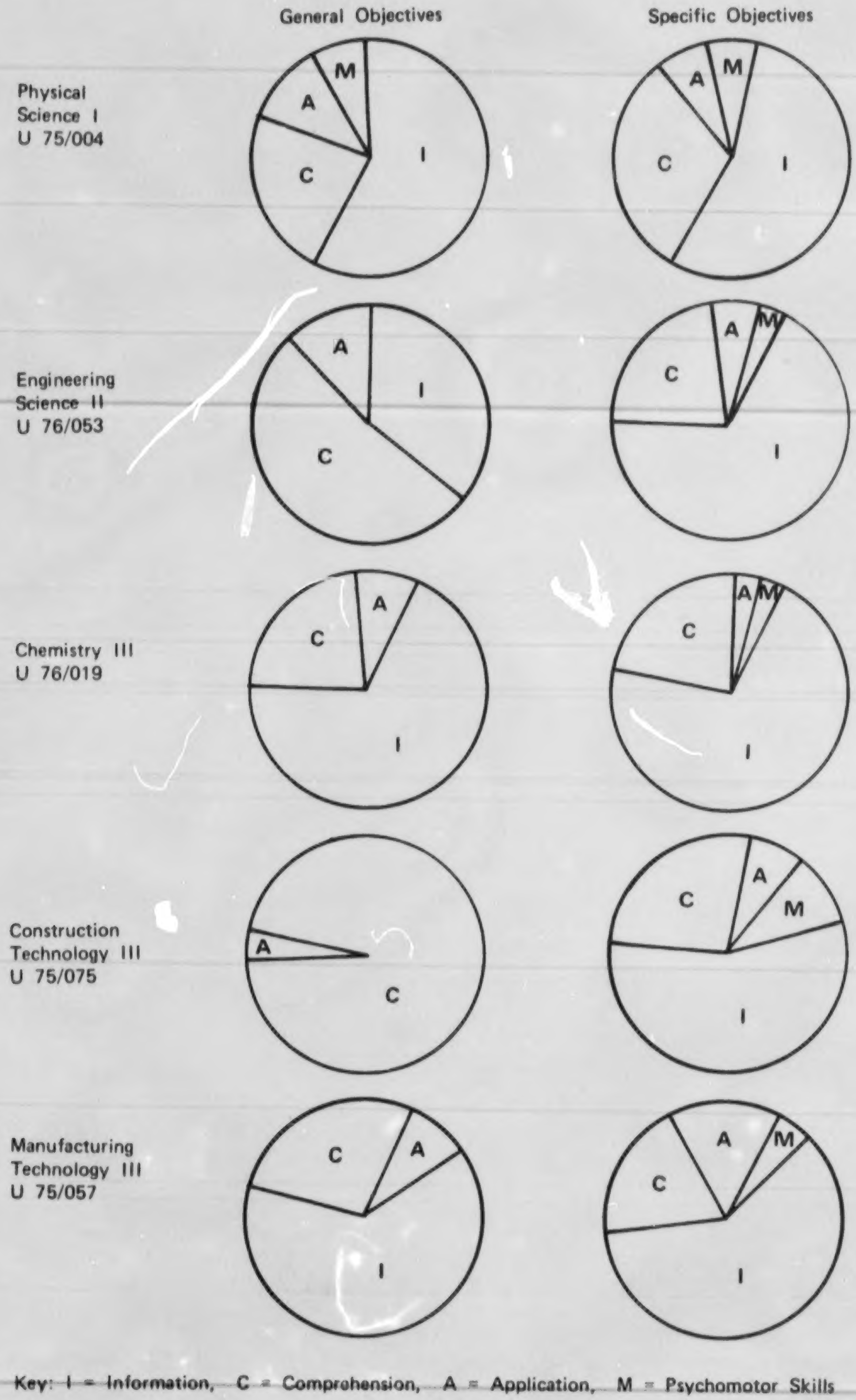
The classification of objectives proposed by Bloom and his colleagues arranged the ability to recall Knowledge of specific facts, methods, principles and theories at the lowest level and the ability to Evaluate materials and methods at the highest level of an intellectual hierarchy. The simplified classification used by TEC adopts the hierarchical concept, higher level skills being considered to be more difficult to acquire than lower level skills. This concept is helpful as a design aid, but there is a danger if it is regarded as absolute. It would be preferable for the six levels of the Bloom taxonomy or the four levels of the TEC taxonomy to be regarded as a convenient classification in which categories are not sharply defined and are not in a strict hierarchy. For example before a student is able to recall or 'KNOW' a new concept it may be necessary for him to go through the process of ANALYSIS of the relationship between other concepts. Also his COMPREHENSION and ability to solve a problem (APPLICATION or ANALYSIS) may require him to be able to evaluate his previous learning experience.

Categories of objectives

In bringing together the Bloom levels of Analysis, Synthesis and Evaluation in the category Invention, at first sight TEC may appear to have helpfully simplified the taxonomy for various teachers less familiar with its application. It is suggested however that some teachers do not find the term Invention easy to use in analysing objectives. Any possible advantages from collapsing the three categories into INVENTION risks the likelihood that these skills will be under-emphasised in the design, and consequently the implementation of units. Analysis of the technic-

62. The distribution of categories of objectives in Standard units. The general and specific objectives of five Standard units were analysed in accordance with the TEC categories Information (I), Comprehension (C), Application (A), Invention (V) and Motor skills (M) (Figure 9). The left hand column of pie-charts classifies the general objectives and the right hand column the specific objectives. It is only appropriate to consider the distribution as an approximation for two reasons: firstly in some cases objectives cannot be unequivocally categorised, and secondly and fundamentally the balance of objectives in terms of intellectual demand does not necessarily relate to the number of objectives in a category. There is no simple relationship between the numbers of objectives in a category and the amount of time that should be notionally assigned to their teaching or learning. For example, one might postulate that to achieve a single objective in the Application category might take longer than to achieve an objective in the Information category, particularly if this were regarded as being at a lower intellectual level. However a numerical analysis indicates the likely degree of emphasis which will at least be given to the categories of objectives and associated kinds of learning by teachers of the units.

***Figure 9** Distribution of categories of general and specific objectives in five Standard units*



al units in the Certificate Programmes shows a very high dominance of the Information and Comprehension categories of knowledge and

63. The pie-charts (Figure 9) show the predominance of objectives in the intellectual categories Information and Comprehension and the relatively low emphasis (at least in terms of the expression of intended outcomes of learning) in the skill categories Application and Invention. In general terms

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skills. In fact in those units examined in more detail (Figure 9) few if any objectives used verbs which suggested they should be classified in the category Invention.

The separation of Motor skills from the cognitive skills has undoubtedly led to some uncertainty about the categorisation of particular objectives. The danger that areas which combine intellectual and manipulative skills such as laboratory and workshop activities will be underemphasised is evident in the relatively few objectives written and defined in the category Motor skills.

Ambiguity inherent in the specific objectives

The TEC approach recommended that specific objectives should include a statement of the 'constraints' within which the objective is to be realised rather than 'conditions' and 'standards' as advocated by some protagonists of behavioural objectives. Expressing the intended outcomes of learning precisely is a difficult task. Writers are faced with a limited number of suitable behavioural 'action' verbs at their disposal. Frequently there is a lack of common understanding as to their meanings. For example words like 'solve' and 'compares' can be associated with content requiring only a relatively simple comprehension or a much more sophisticated analysis. Ambiguity can often only

this is true for the units at all Levels I, II and III. Motor skills take a low profile. The appropriate distribution of objectives is a matter for continuing discussion amongst subject experts. For example a group of six experienced teachers of Construction Technology IIIA believed that Invention skills should be reserved for higher level units.

64. **A comparison of categories of general and specific objectives.** For each general objective some two to nine associated specific objectives have typically been written. The distribution of general objectives is generally similar to the distribution of specific objectives, bearing in mind that each general objective usually has only one verb (Figure 9). Of the units analysed Construction Technology III provides an exception, for in this unit all but one of the general objectives use the verb 'understands' so accordingly they are classified in the category Comprehension.

65. **Specific objectives – Physical Science I.** Taking by way of example specific objectives in the unit Physical Science I (U75/004), about 65% are concerned with developing the student's ability to recall Information and about 25% with Comprehension.

Nine objectives out of a total of 181 are identified as Motor skills. Whilst this may be consistent with the aim of the unit as an introductory theoretical base to further studies, it might be argued that a greater emphasis to the development of laboratory skills would be appropriate. The action verbs 'defines', 'describes' and 'states' occur respectively 30, 30 and 41 times highlighting the amount of information learning expected. The large number of cognitive objectives covering a substantial amount of subject matter imply that little time will be allocated for practical activities and a rapid coverage.

66. This particular unit specification states that the objectives 'include more material than can be included in any one unit . . . for some students not all the objectives need be taught, some already having been met . . . as a result of study at school'. Even with this permitted selection from the nine topic areas within the unit, the evidence is that the demands are likely to be more than can be met in 60 hours. The TEC policy and officers emphasise that the time of 60 hours attributed to most Standard units represents a 'design-length' (and not necessarily the time a student will actually spend on the unit, which should be dependent upon his needs). The evidence from practice suggests that 60 hours usually becomes the fixed allocated teaching span. In many cases this also includes the time for assessment; in some cases assessment is undertaken in additional time.

Difficulties in expressing and interpreting objectives

67. Although the aims and general objectives are often clearly expressed many of the specific objectives lack the detail or precision of an objective statement of expected student attainment. For example in Physical Science I (U75/004) the objectives '16.7 solves simple beam problems', and '19.4 describes a simple cell'. It is doubtful whether the word 'discusses' (objectives 18.6 and 19.8) in 'discusses the damage done by rusting' is meaningful in a unit at Level I.

In the specific objectives verbs are sometimes found which should really only be used in a general sense and so the required learner behaviour is not precisely specified. For example the word recognises is inappropriately used in the units, Physical Science I, Chemistry II and Manufacturing Technology III, and presents difficulties in General and Communication Studies.

No direct indication is given in the Standard units of the category of each specific objective, although indirectly guidance may be available through the assessment analysis.

be removed if a full amplification is given in terms of constraints, or conditions, perhaps with standards, under which the required skills will be performable by the learner. However it is doubtful if it is possible to write the many objectives of a two of three year programme of technician education with this kind of precision at least not without very substantial resources.

Many of the specific objectives of the units examined are in fact written without specifications of the constraints. In these cases their objectivity is called into question and they are open to alternative interpretation. Although designers of a particular unit or series of units might negotiate their understanding in the process of writing the units the possibility of alternative interpretation remains the problem of other implementers.

Although TEC Guidance Notes included examples of the expression of objectives in the Psychomotor and Affective domains, relatively few objectives have been written in the Standard or college units. It is particularly difficult to write Affective Objectives.

Objectives-overcoming ambiguity

Whilst there will not be agreement between all teachers in the precise meaning of the operational verbs it is suggested that, in respect of the present TEC classification of objectives, unit designers should indicate the 'level' in the taxonomy at which they intend the objective to be pitched. This would help communication between the curriculum designer and the teacher. It is also likely to cause careful choice by the designers of the verbs used to express the objectives.

Consideration should also be given to stating fewer specific objectives by omitting those which are subsumed by other 'higher level' objectives in the same unit. This should help to avoid undue emphasis on the more 'trivial' objectives. In writing units potential overlap and links, between objectives of related units,

68. In a workshop run by a member of the evaluation team a group of six experienced teachers of the unit Manufacturing Technology III could not reliably classify many of the specific learning objectives of the unit according to the taxonomic level, or the test items devised to check their interpretation. At least 40% of the specific objectives were open to varying interpretations and depending on the degree of commonality of interpretation expected this figure could be higher.

69. In a second workshop six specialist teachers analysing Construction Technology III objectives generally agreed less about objectives in the unit to be assigned to the category Comprehension than to the other cognitive categories. Differences in the assignment of objectives to the category Motor skills were evident. This unit is unusual in so far as a 'topic area' is titled 'Application'. In the Assessment Analysis of the unit designers, all the objectives in the category 'Application' are identified with this area. However some teachers assigned a few objectives to this category from other topic areas in the unit.

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both 'horizontally' at the same level, and 'vertically', at different levels should be explored. Where links and overlap are deliberate this could usefully be indicated.

Objectives and the assessment specification

One of the advantages, claimed by TEC, of specifying objectives is that those responsible for assessing the students' performance will have detailed and unambiguous information on which to base the schemes of assessment. Whilst the present list of unit objectives, with a corresponding assessment plan can provide a more balanced and controlled assessment of a range of knowledge and skills than less systematic approaches it is unlikely to lead to a precisely uniform provision of assessment by different teachers in different colleges.

Specification of objectives – further development

In the longer term, in an attempt to overcome some of the limitations of the present classification, the suitability of alternative classifications should be explored through development work and trial. For example, a classification of objectives in science education has been developed which includes objectives concerned with the process of enquiry, problem recognition and solving, interpreting data and additional behaviours (Klopfer in Bloom et al, 1971). An interesting classification of general objectives has recently been adopted in designing technical curricula in Baden Wurttemburg, West Germany (Westphalen, 1977). The curricula are expressed in the form of statements of broad objectives and content as equivalent components which are complementary to one another. This classification, which probably loses something in translation from the German, uses just ten words to categorise levels of Knowledge (factual information), Skills (operations combining cognitive and motor skills), Understanding (problem solving), and also identifies levels of attitude and motivation

70. **Objectives and the unit assessment specification.** It is stated in the rubric of each Standard unit that specific objectives give 'the means by which the student demonstrates his attainment' of the general objectives. The assessment specification accompanying each unit might therefore be expected to match closely a classification of the specific objectives of the unit into skill categories by independent analysts. This comparison is made (Table 10) for each of the five Standard units. In the first column for each unit, the weighting given to each category is based on an independent classification of specific objectives; in the second column the percentage of marks allocated in the assessment specifications which forms part of the Standard units. Discrepancies between the weightings in any category can be attributed to: a. the differing professional judgements of the original designers of the assessment specification and the analyst of the specific objectives; and b. that whereas the former were no doubt concerned with judging an appropriate balance in terms of the construction of an assessment specification the latter was solely concerned to portray a numerical analysis of the objectives.

Table 10 *Categories of specific objectives in five Standard units (see key)*

Knowledge and skill category	Physical Science I* U75/004	Chemistry II U76/019	Engineering Science II U76/053	Construction Technology III U75/075	Manufacturing Technology III U75/057
Information	65	72	63	56	61
	44	50	35	45	40
Comprehension	25	22	28	26	19
	43	28	40	30	30
Application	5	3	6	8	15
	4	15	15	25	15
Invention	0	0	0	0	0
	0	0	0	0	0
Psychomotor	5	3	3	10	5
	13	7	10	0	15

Key: Underlined figures reflect the number of objectives in the category stated (and are expressed as a percentage of the total) obtained from an analysis of the specific objectives listed in the Standard units. Figures are not absolute since different analysts may differ in their classification of particular objectives.

The non-underlined figures are the percentage of marks allocated to each skill category in the Assessment Specification of the Standard units.

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* The data for the Physical Science Unit is for all the objectives in the Standard unit, from which colleges may make a selection.

FEU Commentary

(Appendix I). Individual teachers are left to devise their own precise objectives. Teachers of TEC programmes have indicated, perhaps not surprisingly, that they find the TEC general objectives easier to work with than the specific objectives. Since topic areas and skills can be categorised through their use, a study of the advantages and disadvantages of giving greater emphasis to general objectives rather than specific objectives could usefully be undertaken.

Objectives and the learner

Statements of objectives can help the learner to appreciate what he is formally required to achieve. Whereas many teachers facilitate the students' access to the objectives, about one-third apparently do not. Clearly such access opens up the curriculum to evaluation by the student and the accountability of the teacher and colleges. As a consequence a more open and possibly a more threatening situation can arise than in the case of some previous courses where the objectives were not readily available. Understandably this may not be welcomed, due, for example, to an unavoidable limitation of resources or to human nature.

Enhanced availability of course objectives to students must be encouraged. In situations where teachers believe students may not have the study skills to benefit from such availability, appropriate help should be given as an integral part of the student's course.

Objectives – teachers' interpretation

Teachers of TEC Certificate and Diploma programmes generally have found the objectives approach to be acceptable in principle, although the limitations discussed elsewhere (page 24) in this report must be taken into account. Expressions of dissatisfaction commonly related to matters of important detail and in particular to the vagueness and lack of precision of

Objectives as an aid to the learner

71. Whether students are aware of the objectives will depend on the extent to which the units are made readily available to them. In response to the questionnaire about 65% said they 'did have easy access to the complete list of learning objectives', but the remainder did not have such access. About two-thirds of the teachers with whom this was discussed indicated that they were quite prepared to make the objectives available to students. From interviews with teachers it is estimated that about half of them did in fact give students the objectives either in advance (about 20%), or during the teaching of a unit, either as written statements or verbally. A significant proportion however (about 20%) wait to be asked. The one-third who are unwilling to distribute the objectives or who hesitate to do so, give reasons such as the high cost of printing; the existence of a college policy not to do so; or the danger of misuse by students.

Objectives as an aid to the teacher

72. Teachers expressed varying attitudes to the introduction of the objectives approach. Many were concerned about the constraints they felt compared with the previous syllabuses; others saw advantages – at least in theory. An illustration of their comments (during the early part of this study, mid 1978) is given below.* About one-half of the teachers were finding the objectives approach generally acceptable; the other half were less than satisfied.

Some of the principal difficulties which arose, according to the teachers, from the objectives as presented in the TEC Standard units were that the list of unit objectives, *'gives the appearance of a full syllabus'; 'makes the syllabus look like a teaching order'; 'causes concern where "specific objectives" are seen to be too vague and not "specific" '; 'causes a feeling of constraint and inflexibility'.*

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* Illustrative comment by teachers about interpreting objectives in TEC Units (June/July 1978).

Objectives 'cause constraints' . . . 'we have less flexibility than City and Guilds'. 'Teachers might feel hidebound by objectives which they can't interpret liberally'. Objectives 'constrain the teacher in use of previous experience' and 'are not really necessary'.

'Objectives lead to more consistent teaching', 'the objectives approach could be advantageous', 'it is good in theory'. It 'helps in defining the level of work, and makes clear what is required'. 'The approach "helps assessment – makes it easier to interpret" '.

'The objectives are vague – not enough thought has been given to their writing'. 'Objectives are a matter of language – with problems of depth of treatment'. We 'should teach students what they are motivated to ask – not just the objectives'. 'Different teachers look at (the same) units differently'. 'Objectives lead to more consistent teaching'. ' – help assessment'.

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some of the specific objectives, inherently incompatible with the teachers' expectations of this type of curriculum specification.

About one-third of the teachers of TEC units felt constrained when devising a teaching and learning scheme to follow the sequence of objectives as written in the units. However the majority felt at liberty to devise a programme without such adherence although the self-contained nature of the units means that learning experiences are typically devised for the attainment of objectives within individual units rather than across different units.

Objectives – teachers' interpretation

Standard units were designed with the notion that approximately 60 teaching hours would be available and required for their objectives to be achieved presumably by students of average ability. Teachers' initial experiences were that many of the units were too long for a satisfactory learning base for all the objectives to be achieved in this period of time. They expressed concerns that such units are overfull. Where the objectives lack precision this contributes to the problem. Since many teachers over the years have learnt to adjust their approaches in implementing previous and less well-defined syllabuses to a depth consonant with the notional study time available to students, this problem may in the case of some units be transitory.

Teachers in identifying 'reliance on their own experience' and 'taking into account student needs' as factors which enable them to decide how much time to allocate to the teaching and learning of particular objectives, are illustrating the intuitive experientially based nature of their work. The adjustments they make are likely to be much influenced by their own industrial and/or academic experience and also by their observations of former groups of students. Teachers with differing experiences may judge certain objectives to be of greater or lesser

73. There is however substantial acknowledgement that the objectives do help in defining the level of work. Some senior staff commented that the format of the TEC units causes lecturers to be increasingly analytical and critical of what they teach. The objective format was generally seen as being of particular value to the less experienced teacher who is likely to adhere more closely to them. 'One in three (TEC programme organisers) spoke of the desirable influence TEC was having either by accentuating the professional responsibilities of teachers, or by urging upon staff patterns of classroom activity which they should have adopted long ago'.

Teachers' practices when interpreting unit objectives

74. In spite of reservations about the quality of some of the objectives, a large majority of teachers (about 90%) who responded to the questionnaire (Part 2D) claim that they do give careful consideration to the aims of the units and to the specified list of unit objectives. They claim to take account of both the general and specific objectives (90%) and to give detailed attention (88%) to the latter.

75. The evidence collected independently through college visits and postal questionnaires, suggests that although the majority of teachers (60%) do not treat the lists of objectives merely as a list to be followed in a sequential stepwise fashion, a substantial number (26% by questionnaire, about one-third in discussion) apparently teach to the order of the objectives as they are listed.

76. Among the factors which may influence the teacher as he plans the 'teaching' of a TEC unit are: the aims of the unit, the list of objectives stated in the unit, the teaching and learning methods he might use, the assessment requirements stated in the unit, his previous experience of teaching, the resources and time available, his perception of student needs. Many teachers (68%) indicated that in deciding how to teach a unit they decide the sequence in which the objectives should be achieved BEFORE deciding the appropriate teaching and learning activities. These teachers are probably adopting an approach which gives priority to structuring the subject matter and skills to be learnt.

77. Some teachers (c. 24%) indicated that they gave priority to deciding the teaching methods and learning activities which the student should experience before deciding the sequence of objectives. It is suggested that they are giving greater emphasis to the process of learning. Some teachers (40%) indicated that they used the assessment plan in deciding WHAT to teach. Some 60% took account of phase tests from previous years when planning assessment.

78. When asked how do they decide how much time to devote to particular objectives, teachers frequently speak of *'relying on experience'* and *'taking into account student needs'*.

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worth. For example, evidence suggests that whereas in general teachers of Mechanical Engineering A5 programmes might be expected to reflect their industrially-oriented experience of typically more than a decade ago (see paragraph 33) teachers of Science C1 programmes will reflect their academically-oriented experience. Since it is an aim of TEC programmes to be designed for changing technician occupations it is important that the teacher himself is enabled to keep abreast of developments in this respect.

Teaching and learning methods

The objectives format has caused teachers to be increasingly analytical of their teaching. The new curriculum framework has at least required teachers to rethink how their previous practice can be accommodated with replanning. We believe that in general the changes which teachers have made are predominantly changes in strategy rather than methods, and changes of an organisational kind in response to the demands of the new structure with regular phase tests and more formalised assessment requirement.

Whilst there is some evidence of the development of materials in the form of overhead projector transparencies and handouts, that is to say aids which enable the teaching of the course to be accelerated, there has not been any apparent major shift in teaching and presumably therefore learning methods.

The apparent reduction in laboratory work may be attributed to two factors: firstly the emphasis on Information and Comprehension categories of knowledge and skills in the specification of the units, together with the absence of examples of specified laboratory activities, secondly the unit structure itself which tends to lead to a compartmentalised timetabling of a set period of time, say 1½ to 2 hours per week in the same classroom. Teachers appear to have judged that the units require

Teaching and learning methods

Teaching and learning methods – the teachers' viewpoint

79. Many teachers indicated that there has been little change in the day-to-day teaching, learning and classroom practices accompanying the introduction of TEC programmes. There is, however, some evidence from discussions with teachers that the unit and objective approach is causing teachers to do more planning. In some colleges it appears that there has been more development of material for overhead projector transparencies, of preparation of teaching or learning packages to meet specific objectives and of team teaching.

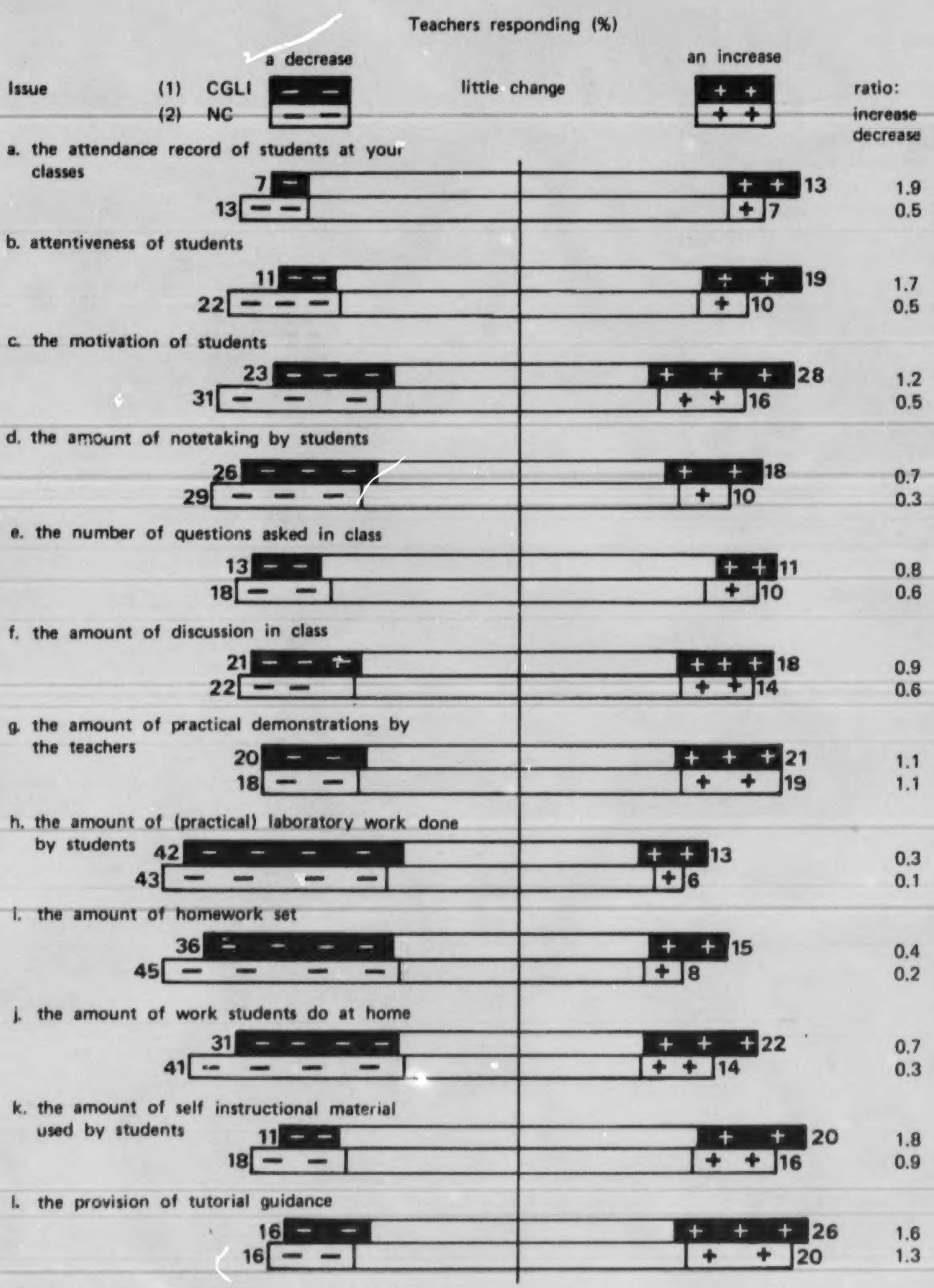
80. The response 'little change' occurred least often to questions about the effect of the introduction of TEC programmes on laboratory work (Table 11). Teachers (40%) indicated that they believe there has been a decrease in 'the amount of laboratory work done by students', the response being similar whether teachers were considering the replacement of CGLI or of National Certificate courses. (Thirteen per cent in the case of CGLI and 6% in the case of NC indicated an increase.) However in responding about their work activities, 48% indicated they spent 'about the same time' on 'supervising students during laboratory workshop or other practical sessions'. Teachers (about 20%) comparing the new with either the CGLI or NC provision believe that there has been an increase in practical demonstrations.

During the team's visits to colleges, teachers spoke of a swing towards a more academic treatment of content in the units. The perceived fullness of the units mitigates against spending time in the laboratory. About half of those who were concerned about the decrease in laboratory work indicated they attempted to overcome the shortage of time by doing more demonstrations.

81. More teachers believed that there was a decrease in 'the amount of homework set' and 'the amount of work students do at home' in comparison with the replaced courses than those who expressed the contrary view (Table 11, items i. and j.).

At least half of the teachers who responded to other items indicated that little change had occurred although rather more of the remainder believed that there was a decrease in the amount of notetaking, question asking and discussion in class. The balance of the responses indicated that rather more teachers believed that there was an increase in attentiveness and motivation of students compared with CGLI technician courses than those who believed otherwise. There was a perceived decrease in attentiveness and motivation relative to the ONC provision.

Table 11 *Teachers' opinion (as % respondents) of the effect of TEC programmes on Teaching and Learning practices in comparison with (1) the replaced CGLI course(s) and (2) the replaced NC course*



*includes a small percentage 'unable to judge'
For CGLI N = 193–195; for NC N = 161–165 depending on item.

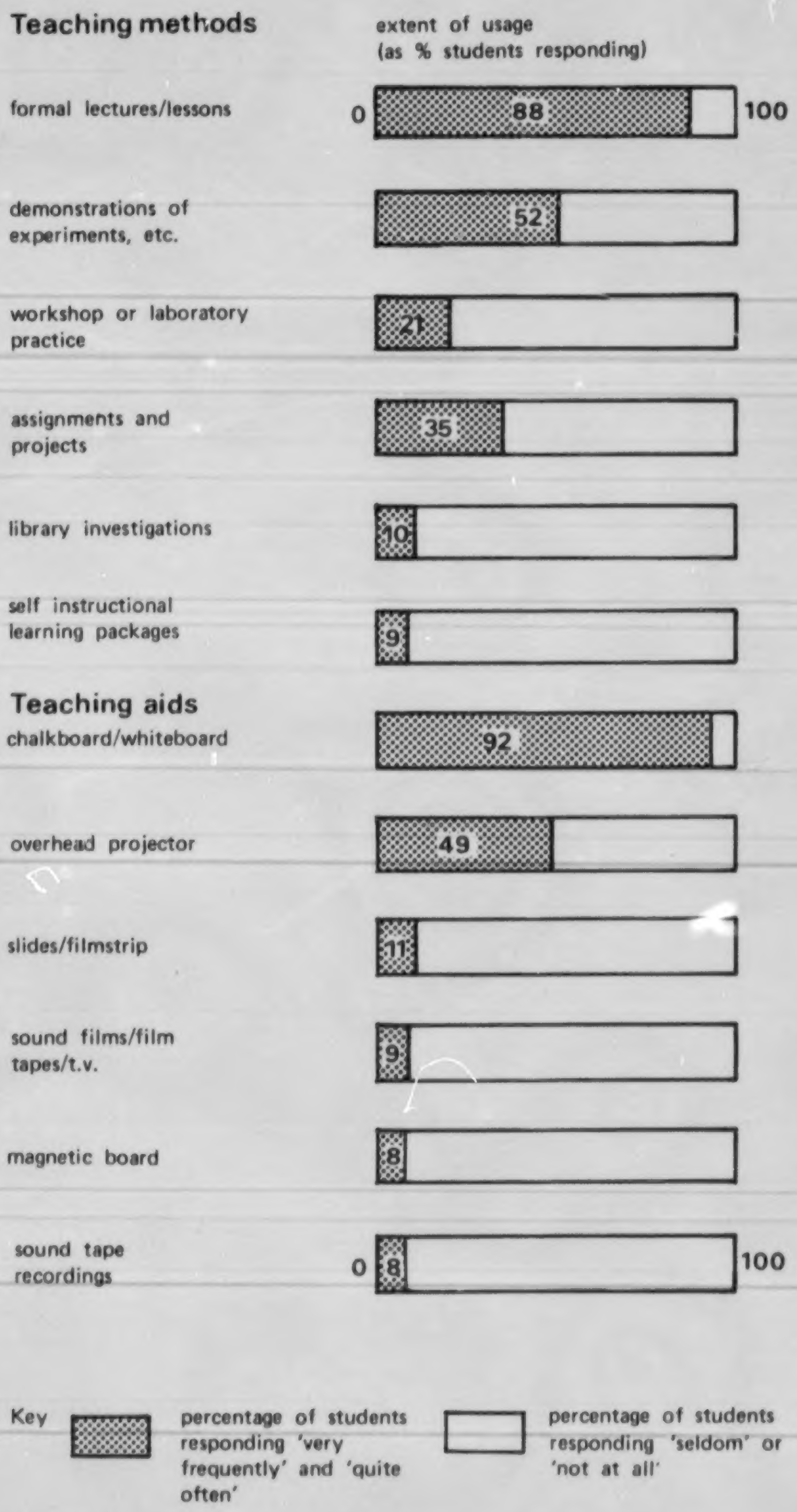
more rather than less formal learning. This may be transitory. However if teachers judge that students should spend more time in the laboratory or workshop then it is suggested at least two of the following steps are necessary: (1) modify the style of presentation of the curriculum specification of the units; (2) involve lecturers with practical expertise in the further development of the curriculum; (3) train teachers in the interpretation of objectives in the existing units. There is some evidence that TEC has recognised this as a problem.

In theory, the expression of objectives can help the selection of teaching methods and learning experiences, providing the objectives are appropriate and well written. However, appropriate methods are as likely to be derived from an analysis of the learning difficulties of the students as from the specification of the curriculum. TEC has provided little guidance for the teacher on how he might cater for individual differences in learning.

A publication by the Welsh Joint Education Committee (1976) gives valuable illustrations of how activity-based teaching/learning sessions can be devised to meet objectives and assessment concerned with transferable mental skills and personal qualities. In such laboratory and project activities the teacher's role is to help, question, inspire and guide the student.

There has been an apparent change in emphasis on the nature of the work required of students which is done 'at home'. Certainly in the case of those programmes in which there were, at least initially, up to six assessment points (or more) during the unit, less formal homework was set and marked, students being expected to prepare for the phase tests.

Table 12 *Methods and Aids used by teaching staff – according to student responses [N=430]*



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Teaching and learning methods – student opinion

The majority of students, according to their questionnaire responses, held generally favourable views about the teaching methods they experienced. Nevertheless their responses suggest teachers should give further consideration to a greater use of visual (television and film) media.

In a study of attitudes of engineering technician students towards their courses, Garland (1980) also found that they generally had a favourable attitude towards the teaching experience. The most markedly unfavourable response was also towards the value of General Studies, differences in response between students of TEC, ONC, or CGLI technician courses being not significant. Other studies of student attitudes have also suggested general student acquiescence to the teaching and learning experiences provided (Mansell, J., 1967).

The learning demands of the units appeared to be of an appropriate order for many of the students in this sample. However about one student in four indicated that the rate of learning was too rapid. Teachers have also indicated the need for more time for students learning (paragraph 276). Another study of the introduction of certain TEC units in an Engineering (A5) programme concludes that an apparent contradiction between students' views, that the units were considered to be 'easy' yet 'taught too quickly' and 'demanding' related to the quantity of material included (McCallum, 1979). In view of the wide range of ability, as measured by student entry qualifications from four or more to no passes at 'O' level (or CSE grade 1) (see paragraph 54), further studies might usefully be undertaken to identify characteristic learning difficulties. Every attempt must be made to cater for individual aptitudes in what in most colleges at the present time remains largely a grouped-pace provision.

It is somewhat disquieting that over half the students expressed the view

Teaching and learning methods – the students' viewpoint

82. Responses from a small sample of students (430 in 27 colleges) (Table 12) suggest that the principal teaching method is the 'formal lecture or lesson', with extensive use of chalkboard, whiteboard, and/or substantial use of the overhead projector. Film and television are rarely used. There is a substantial amount of demonstration of experiments in the technical units, and of workshop and laboratory practice. The overall response of students suggests that from their view-point and experience, the majority find the classroom and learning experiences satisfactory in most respects. Many students (70%) indicated that 'the content of the unit was presented in a progressively organised way' rather than to the contrary. Also 73% felt the pace of lessons/lectures was usually satisfactory whereas 25% did not. This corresponds well with the figures of 64% who felt the amount of time allocated was 'just right' and 28% who said there was 'too little' time with only 7% responding 'too much time'.

83. Only a few students found the work required by the units 'too difficult' or 'too easy', most responding either 'fairly difficult' (40%) or 'just right' (54%). The majority believed that they gained 'adequate understanding', and expressed varying degrees of satisfaction about the assessment procedures, and responded that the units linked 'fairly well' (57%) or 'very well' (25%) with other technical units. However more students (54%) expressed the view that General and Communication studies had been 'not at all successful' in helping them to communicate technical information to other people than those who responded 'quite successful' (33%) or 'very successful' (6%).

84. Teachers prepare a substantial amount of material for students in the form of 'handout' material, typically summarising notes on theory and practice. Whilst the majority of students indicated that they were usually 'adequate in number', 'easy to understand' and 'issued at the right time', 55% indicated that they did not usually include 'supplementary reading lists'.

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that General and Communication studies had not helped them to communicate technical information to other people, but it must be recognised that many of the respondents were in the first or second year of a TEC programme and of their working life. A student's attitude to General and Communication studies will be influenced by those of his employers as well as his experience at college. His more senior colleagues at work may have experienced former provision in this area rather than the new units in TEC programmes.

In the early years of TEC programme development teachers have found it necessary to use an increased number of handouts, since in the case of some units, suitable textbooks were not available. Students indicated that teachers do not often recommend additional sources of information. This may in part be attributed to the lack of books judged to be suitable, but also to a somewhat traditional reliance by the teacher him(her)self as the principal source of learning material for the young part-time day technician student.

Tutorial and less formal approaches to learning

The principal teaching methods in previous technician courses have been the 'lesson' or 'interrupted-lecture', with laboratory and workshop activities and possibly problem-solving tutorial classes. Students' learning experiences continue to be centred on the former input by the teacher, from which students obtain an interpretation of the curriculum (in this case the objectives) which will be tested and examined. The approach adopted is one in which the teacher takes the major responsibility for determining the study-rate and content (objectives) to be learnt (achieved). Less formal methods take a low priority in timetabling arrangements.

TEC 'encouraged colleges to develop informal approaches to teaching, and to allocate to the student time for self-instruction, the

Tutorial provision

85. It is part of the TEC's policy to encourage 'an adequate tutorial system for students working for its awards although it appreciates that this may not be easy to organise for part-time students' (TEC Policy Statement 4.10). Colleges are finding it difficult to arrange as a deliberate feature of the timetable tutorial periods for the day release students. They often give *'shortage of time'* as their main reason for not doing so but this also reflects the conventional teaching pattern for the replaced courses and the available resources. Generally colleges have not yet moved to reducing *'the formal contact of the student with his teacher'* in order *'to develop informal approaches to teaching and to allocate to the student time for self-instruction'* (Part 2B). Nineteen of the 30 programmes did not offer a genuine tutorial period for part-time students although some set aside periods for phase-testing, arranging re-tests and keeping up-to-date with the planned lecture/lesson schedule. A greater proportion (26%) of the respondents from small colleges reported an increase in tutorial provision than those from medium sized (12%) or large (12%) colleges.

86. Students of programmes, which included timetabled tutorial periods, were invited to respond to a series of pairs of opposing descriptors of possible characteristics of tutorial periods (Table 13). Generally they give a charitable view. [This is in contrast to a report of the introduction of TEC programmes at one particular college where students described the tutorial as unsatisfactory in various ways (McCallum, 1979)]. More than half of the students indicated that tutorials, 'improve their understanding of course work', 'encourage student involvement', 'improve student-teacher relations'.

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organisation of his work, and assimilation of what he has been taught' (Policy Statement 4.7). 'The Council will hope to see an adequate tutorial system for students working for its awards, although it appreciates that this may not be easy to organise for part-time students'.

Colleges have found such methods difficult to organise for the part-time student. There is little common understanding of what is meant by a

Responses to other items are shown in Table 13. A reluctance by a substantial number of students to polarise their responses may in part be interpreted as an uncertainty as to the role of tutorials. Whereas 45% of the students indicated that tutorials 'consolidate learning' only 21% expressed very strong or general agreement that more time should be devoted to them.

87. Colleges which did not provide tutorials as a deliberate feature of their timetable for day-release students, gave the shortage of time as their main reason for not doing so. Some colleges have timetabled additional evening attendance, but the students were not willing to make up time in this way; neither would employers agree to an extra half day for study at college. In planning and timetabling the teaching programme, tutorials are seen as of lower priority to the 'lecture/lesson' schedule. In some instances this appears to be exacerbated by the feeling of teachers that *'units are too full to afford the luxury of timetabled tutorial periods'*. The following practices were

Table 13 *Student responses about tutorial periods* *

	Students in very strong agreement or general agreement with the statement that tutorials:		Mild Preferences ▨		Students in very strong agreement or general agreement with the statement that tutorials:
1.	Improve (their) understanding of course work	64		10	Don't improve understanding of course work
2.	Encourage student involvement	55		6	Discourage student involvement
3.	Improve student-teacher relations	52		3	Create student-teacher tensions
4.	Develop personal confidence	40			Restrict confidence building
5.	Consolidate learning	45		10	Waste class time
6.	Create interest within programme	45		12	Generate boredom within a programme
7.	Improve opportunities for discussion	45		14	Avoid student discussion
8.	Are a useful feature of the course	45		12	Are not really worthwhile
9.	Highlight the academic and theoretical work	42		14	Highlight aspects of practical work
10.	Solve (their) individual learning problems	42		8	Individual learning problems seldom solved
11.	Ease the workload produced by the course	40		8	Add to the workload
12.	Offer rewarding learning experiences	35		8	Lead to increased frustration in class
13.	Stimulate independent thinking	34		17	Are teacher dominated
14.	Are well managed	27		17	Are badly managed
15.	Should have more time devoted to them	21		14	Are allocated too much time

*154 students from 13 colleges responded.

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tutorial (eg whether it is a 1:1 situation between a student and his teacher, or a group of, say, four students, etc). Some colleges have set aside a period of time – up to 1½ hours per week – which is used for a variety of purposes, including counselling to help individual students, but more particularly for use as a phase-testing or re-testing time, or for problem-solving classes.

Some colleges regard the guidance given to students, particularly at the start of each academic year, as tutorial work. There is no doubt that much more time is required and spent on 'counselling' students about study choices and progress compared with previous provision.

Although many teachers indicate that tutorial sessions do not at present form part of their work, there is some evidence to suggest that many would like more opportunity to undertake them. Training and guidance in the use of tutorial time is needed for both teachers and students.

The specification of objectives can in principle facilitate the selection of appropriate teaching and learning methods. In general little thought appears to be given in the organisation and timetabling of units, about which objectives might best be achieved through learning in large groups, small groups or individually.

Subject matter

The extent to which the subject matter of TEC programmes has changed from that of previous technician courses has not been a major component of this evaluation. In the earlier stages of the enquiry from which the main study was formulated, teachers were more concerned with understanding the implications of TEC policies on syllabus presentation and assessment rather than the content as subject matter.

encountered: the provision of tutorial periods in time which otherwise would be allocated to project work; the deliberate encouragement of informal guidance rather than formally timetabled tutorials; and the allocation of a number of periods per term for remedial work. Members of the evaluation team visiting colleges reported that *'nearly all lecturers wished that time would allow proper tutorials to be organised.'*

Subject matter

88. A detailed analysis of the subject content of the many Standard and college-devised units available in the Mechanical Engineering (A5), Building Studies (B2), and Science (C1) programmes is outside the scope of this study. In the initial-phase of open-ended enquiry, in the summer of 1978, questions to teachers such as 'are there any differences in content between the old technician courses and the new or not?' or 'what have you to say about the content of the programme?', typically led to responses about the units being *'overfull'*, *'too long'* and the *'content too great'*, *'the lack of a national syllabus'* rather than an identification of changing content. On the other hand occasionally a quite novel unit content, in comparison with the 'equivalent' previous course, had been designed.

89. Most programmes at Certificate and Diploma level developed in the period 1975-78, were designed without consideration of the content of the Higher Certificate and Diploma Programmes. Where such TC/TD programmes include a substantial number of college-devised units it appears that difficulties have arisen in accommodating ideas in the subsequent development of the programmes for the Higher awards.

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The relatively short timescale for designing the new Certificate and Diploma programmes generally led to a 'bottom-up' approach to curriculum design, that is to say the design of these programmes without a consideration of the content of the programmes to be developed for the Higher technician awards. In further development, the relationship of the curricula for the two levels of awards should be explored more systematically. This could help to ensure the coherence of programmes in the same area and avoid excessive demands in the content of any one unit.

In general the Building Studies B2 Certificate programmes appear to have greater uniformity of content than the Mechanical Engineering A5 or Science C1 Certificate programmes. This reflects the more wide-

Technical units

90. Table 14 shows the total number of Standard units and college-devised units for colleges in the FEU sample pool offering A5, B2 and C1 programmes (from data available on TEC computer records at February 1979).

Table 14 *Total numbers of Standard and college-devised units for a sample of colleges**

Certificate Programmes	Number of colleges	Total number across all colleges: Standard units	Total number across all colleges: College-devised units	Ratio: college-devised units / No. of colleges
A5	86	77	301	3·5
B2	38	30	41	1·1
C1	19	60	88	4·6

* Includes some half-units and double units, but excludes General and Communications Studies units.

Whereas in the case of A5 and C1 programmes on average 3·5 and 4·6 college-devised units were developed per college, in the case of B2 programmes the comparable figure is only 1·1 units per college.

91. Whilst many of the college-devised units are locally-devised variants of Standard units (eg units in Engineering Science, and Drawing and Design, in A5 programmes; Mathematics in B2 programmes; and different emphases in Chemistry units in C1 programmes), TEC has provided opportunities to include more specialist units either to meet specific industrial needs or possibly the predilections of course designers or both. Examples or titles of college-devised units are:—

In A5 programmes
Basic Glass Science
Diesel Technology
Elements of Computing
Engineering Materials
Energy Conversion
Glass Technology and Manufacture
Introduction to Power Station Instrumentation
Metal-Joining Technology
Numerical Control
Planning, Estimating and Costing
Pneumatic Systems
Polymer Technology

In B2 programmes
Introduction to Computing
Financial and Cost Accounting
Small Works Organisation and Procedures

In C1 programmes
Atomic and Nuclear Physics
Electronics
Glass Blowing
Laboratory Organisation
Microbiology
Photography
Radiation
Vacuum Techniques

92. Several experienced teachers involved in the development of the TEC programmes were asked to comment on the content of a sample of programmes, and their responses are illustrated below.

Mechanical Engineering, A5 programmes

A scrutiny of a sample of Val III forms suggests the majority of colleges adopted the model programmes proposed by the TEC A5 Programmes Committee, with some offering supplementary units at Level III. An experienced Head of Department writes: *'Few colleges considered "Mate-*

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scale adoption of the fewer Standard units available in this area, the needs of the construction industry being similar in different regions.

The encouragement of the unit structure by TEC has provided the opportunity for components of the programme to be designed to meet the more specialist needs of particular groups of technicians and industries. Although there are examples of colleges taking up these opportunities the content of programmes generally appears to be strongly influenced by the decisions made by the programme committees in identifying standard programmes and units.

A notable change in the case of science programmes from previous provision is the inclusion of a unit in Safety and Laboratory Practice. Some evidence suggested that the new courses provided a broader curriculum than those replaced, possibly with some consequential sacrifice in depth. However any firm conclusions would require more detailed study of the range of specialist knowledge and skills in individual programmes.

The A5, B2 and C1 programme areas are the more general programmes in each of the A, B and C sectors. It is to be expected that in the more specialist programme areas, eg A4, Industrial Measurement and Control, C6, Printing, a greater degree of change from previous provision may be identified.

Generally although some colleges have used the TEC formula to include new areas of study, most colleges appear to have been content to re-group familiar material under new unit titles. As these programmes are concerned with the basic levels of technician education and thus deal with content that would be considered by many teachers to be fundamental if not classical, in nature, the relative lack of radical content is not surprising.

rials" worthy of separate treatment in 1975-76, as did the A5 Programme Committee yet the need to develop this subject is seen as essential by many industrialists . . . Most TEC units have been designed on the premise of what has been done before (in ONC and CGLI schemes). It must be remembered that the ONC courses sought to provide a part-time study route for the technologist, until the late sixties. Few changes in knowledge content occurred in the ONC Engineering in the seventies, and most of this "revered" information went into the TEC units'. A feature of many of the programmes is the inclusion of a Project unit at Level III.

Building Studies, B2 programmes

93. An experienced programme co-ordinator, who had developed a programme of mainly Standard units, estimated that *'about 50-60% of the content had been taught in the syllabuses replaced by TEC and a further 20-25% was implied rather than stated by the previous looser syllabus format, the interpretation of what had to be taught (had previously) varied considerably between individuals and colleges. Some 20-25% of the curriculum topics (in the TEC programmes) are entirely new, for example all of the objectives in Design Procedures II and a substantial proportion of those in Organisation and Procedures I require of the teacher knowledge and skills which were not previously demanded . . . In every unit a few topics would come into this category but many of them would be closely allied to familiar items.*

94. *'With regard to a whole range of (B2) units there is little doubt that the specific objectives have caused teachers to up-date and revise on topics which they had neglected but none the less could have been legitimately included under the CGLI or ONC syllabi. Considerable effort must have been expended by many people in Construction Technology at all levels. Science and Materials II, Measurement III, Applied Mechanics III, Structural Detailing II (B4 programme) and Site Surveying III. In each the division of subject matter and the time distribution permits a slightly broader and deeper treatment.'*

Science, C1 programmes

95. In many schemes the Level I units correspond in title and broadly in content to the former CGLI General (G or G*) Course in Science except, that in addition to Mathematics, Physics, Chemistry and General and Communication Studies units, a unit of Safety and Laboratory Practice was considered essential. Biology is essential for programmes with a Biological Science bias. Some programmes offer Workshop Processes and Materials I, usually as an essential unit in programmes with a Physics bias. In a random sample of 12 programmes, Materials Science was offered either optionally, or essentially at Level II in programmes with a Physics bias, whereas Drawing was not openly mentioned in any programme. At levels II and III, programmes offered at different centres vary considerably in their unit composition. Many programmes closely resemble the C1/C2/C5 Programme Guidelines.

96. An experienced Head of Department commented on the Standard units in his own programme that: *'the time allocation and content of Physics II, Physics III (½ unit) and the physics content of Laboratory Techniques II and III is broadly equivalent to ONC Basic Physics. The topics of heat and nuclear physics, however are covered in substantially more depth in the TEC Programme . . . Inclusion of a full unit of Physics III, of Material Science II and Electrical Systems III (in the KO2 option*) amounts to more than that for the ONC Elective Physics option and is possibly too ambitious both in terms of content and time . . . Treatment of TEC topics tends to be more superficial than those for ONC . . . Practical work in TEC units emphasises the use of apparatus, test procedures, familiarity with equipment, etc, whereas ONC concentrated on the more usual and formal applications in which experiments*

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* Each combination of units leading to an award is given an option number K.

were fuller and required measurement of data, treatment of results, precautions to be taken, estimation of errors etc. An Assignment III unit allows the development of the more traditional type of practical application'.

97. *'In the chemistry-based units practical work, ie Analytical Chemistry II and the chemistry content of Laboratory Techniques II and III has been separated from theory units, Chemistry II and III. The identification of the practically based units has laid more emphasis on specific practical techniques/applications and has superficially broadened the scope of the TEC programme by comparison with the ONC course. The total chemistry content (of the KO1 Chemistry technicians option) is broadly equivalent to ONC Basic Chemistry but there is a considerable shortfall compared with the Elective Chemistry option . . . Again the Assignments III unit allows the traditional preparative work and physical chemistry experiments to be developed but with more modern treatment'.* The same Head of Department believed that the TEC Certificate programme involved approximately 60 hours less study of Mathematics than did the ONC Basic Science course.

FEU Commentary

Subject matter – General and Communication Studies

TEC's requirements have generally enhanced the status of this area, which must form 15% of the curriculum of all Certificate and Diploma programmes. This is attributed to the expectations that the General and Communication Studies component will adopt a similar format in unit specification including assessment requirements to the technical units. Whilst TEC Policy encouraged the integration of the objectives of General and Communication Studies with those of the technical units, generally units have been devised and implemented separately.

The non-availability of Standard units in this area has resulted in a diversity of college-devised units. However the bringing together of General Studies with the Communication Studies, identified as necessary to fulfil technician job functions and activities, is reflected in an emphasis on learning skills rather than learning bodies of knowledge.

Following experience of college-based developments the TEC Specialist Panel for General and Communication Studies has recently issued examples of general and specific objectives including some exemplary, but not Standard, units. Guidance is also now given on the concepts of Integration and Co-ordination and of Balance between General, Communication and Technical studies (TEC, 1981). Colleges

General and Communication Studies (GCS)

98. There are no Standard units for General and Communication Studies which must form 15% of each TEC programme. Units submitted by 9 colleges were analysed. Colleges attempted to cover basic literacy skills in units usually designated as 'A' (equivalent to Level I units) leaving more creative and expressive work, often involving projects until 'B' (or Level II) units. The link between vocational and general components of the units often only comes through tenuous connections. In general, the statements of objectives suggest that little thought has been given to the possibility of course objectives being generated by students themselves. A member of the evaluation team writes, *'the balance between Knowledge and Comprehension objectives in the cognitive domain often appeared to be weighted towards the former and some units were weak in Application objectives which bore any relationship to the technical content of the programme of which the GCS units formed a part'.*

99. **Teachers' experience.** Members of the evaluation team meeting teachers of General and Communication Studies in 16 colleges write *'Many staff spoke in terms of TEC as being the salvation of Liberal Studies departments. The most vitalising influence was the placing of General and Communication Studies within the formal pattern of assessment; students have now to settle down to this work as much as to technical studies, it leads GCS staff to meet their technical colleagues on an even footing, unthought of in the days of Liberal Studies. Nevertheless, this rise in esteem has not been without its drawbacks, with technical staff in a few cases resenting the new status of the subject. This latter point has led colleges to respond in several ways. In one, the college had identified a member of staff teaching a technical subject who was willing and competent to accept half his time-table on General Studies. Another college made a point of recruiting GCS staff who had some acquaintance with industry or commerce.*

100. *'The label General and Communication Studies can conceal an important aspect of the design of units in this area. While the General Studies in many ways reflects something of the content of earlier Liberal Studies courses, the Communication Studies element has developed much more as an extra contribution to a student's vocational education, in response to arguments that a technical education did little for a student's literacy and ability to articulate. A consequence of this separate evolution of two 'non-technical' subjects has been that for some TEC programmes they appear as two half units. In other cases the two are seen as so inextricably linked that together they constitute a single unit. This dichotomy leads to two distinct designs for the subject. When the course is presented as two half units, it appears that the General Studies becomes extremely specialised and*

FEU Commentary

lacked such guidance at the time of their initial programme design. The nature and rate of adoption of the new General and Communication Studies material by colleges will provide further insight into the extent to which Central TEC initiatives influence curriculum change in the colleges.

Two areas which need further development work are, firstly, the relationship between the objectives of many of the General and Communication Studies 'A', or Level I units, and 'O' level English Language, and secondly the assessment of the achievement of affective objectives and skills.

The level of a unit

Whilst the concept of 'level' of a unit is useful, identifying criteria for the assignment of 'level' can be extremely difficult. Where the knowledge and skills to be achieved can be sequenced in an order which teachers generally agree is an order of learning or acquisition the difficulties may be overcome. Where no such sequence can be identified sustaining the concept of level as a measure of the advancement of learning demand typically associated as study continues can be suspect.

The set of criteria developed by the General and Communication Studies Panel appears to have wider applicability to technical units and should be considered in their development in relation to devising learning experiences as well as objectives.

is taken by perhaps two separate specialists while the Communication Studies is covered by a third person. When however, the two studies are presented side-by-side a single teacher covers both, and a well characterised synergism is set up between the two with the General content providing material for the Communication exercises while the enhanced communication skills improves the value of the general education material. Where the planning and teaching of the Communication component has been accomplished jointly by technical and GCS lecturers the contribution to study programmes has been extremely beneficial to the students.

101. *'Whereas in technical subjects the content is, by and large, accepted as fixed and the question of flexibility relates to the sequence of teaching and learning there was more concern by GCS teachers that a fixed syllabus prevented an effective response to news-items of topical concern. In practice most units allow sufficient scope for staff to respond according to their discretion but within an established framework.*

102. *'A major problem for colleges is the question of credit exemptions from the Communication material in the 'A' (Level I) units if a student possessed an 'O' level pass in English Language. Teachers alluded not only to the problems resulting from giving credit for part of a unit (mostly in terms of time-tabling and scheduling the activities of such a student) but more seriously to the inadequacy of 'O' level as a suitable qualification for exemption, in part because of the oral skills developed and assessed in the unit. Some teachers suggested that students who have failed 'O' level and thus whom are not exempt received "a better deal" through having to follow the complete unit. There is some evidence that students who have formal exemption are persuaded to join their colleagues in class for the whole subject'.*

The level of a unit

103. To assist colleges in the design of programmes and Programme Committees in the validation process, to provide a means of communicating the intended standard and for other reasons (see Circular TEC 15/75), TEC introduced the concept of the level of a unit. The level is based upon the pre-requisite study the student is expected to have completed before starting a unit, and on the recognition of progression in a programme. In the case of General and Communication Studies no definition of level was required. Recently the TEC Specialist Panel for General and Communication Studies (1981) has developed a set of criteria for ascribing levels to units in this area. In summary, 'a progression should be apparent moving from concrete and specific examples to more abstract and general;
from close-ended problems . . . to others which are more open-ended;
from comparatively simple activities such as recall and application to more complex activities of interpretation and analysis;
from the use of simple terms to the understanding and use of more complex concepts and language;
from the performance of actions to reflection upon them;
from dependence upon information and stimulus from the lecturer to student self organisation and independent research'.

'levels should attempt to parallel students' increasing access to experience, their intellectual development, and movement towards greater responsibility in their work, and in their personal and social life'.

Table 15 *Assessment patterns for 12 colleges for the Standard unit Engineering Science II 75/053*

College	Assessment No. 1				Assessment No. 2				Assessment No. 3				Assessment No. 4				Assessment No. 5				Assessment No. 6			
	Topic Areas	Skill Areas	Type of Test	% of Total Assess.	Topic Areas	Skill Areas	Type of Test	% of Total Assess.	Topic Areas	Skill Areas	Type of Test	% of Total Assess.	Topic Areas	Skill Areas	Type of Test	% of Total Assess.	Topic Areas	Skill Areas	Type of Test	% of Total Assess.	Topic Areas	Skill Areas	Type of Test	% of Total Assess.
1	[*]A	IC	SL	10	B	ICA	SL	15	C	ICA	SL	20	D	IC	SL	15	E	UA	SL	10	A-E	ICAM	C	30
2	A	ICM	CP	19	B	ICA	CP	21	C	ICMA	CP	27	D	IC	C	5	E	ICM	CP	8	A-E	IC	SIM	20
3	[*]A	IC	SL	10	B	ICA	SL	15	C	ICA	SL	20	D	IC	SL	15	E	ICA	SL	10	A-E	ICAM	C	30
4	A	ICM	CX	20	B	ICA	SW	20	C	ICA	SW	25	D	IC	SW	20	E	ICA	SW	15				
5	A	IC	SM	7	B	IC	SM	10	C	IC	SM	9	D	IC	SM	14	E	IC	SM	10	A	M	PC	10[+]
6	A	ICM	SMCP	17	B	IC	SM	10	C	ICA	SCM	9	D	IC	SM	14	E	IC	SM	10	A-E	CA	SL	40
7	A	ICM	SCM	10	B	ICA	SCML	10	C	ICA	SMC	10	D	IC	SLM	10	E	ICA	SMC	10	A-E	ICA	SLM	50
8	A	ICM	SCM	6	B	IC	SM	6	C	ICA	SL	10	D	IC	SM	12	E	IC	S	7	A-E	IC	SL	50
9	A	ICM	SCW	12	B	ICA	MS	2	C	ICA	SML	15	D	IC	S	12	E	ICA	S	9	A-E	ICAM	X	40
10	AB	ICMA	S	35	CD	ICA	S	40	E	ICA	S	10	A-E	ICMA	C	15								
11	AB	ICMA	S	10	D	IC	S	5	CE	ICA	S	10	A-E	ICMA	C	15	A+E	MICA	P	20	A-E	ICA	SL	40
12	AB	ICA	S	15	CDE	ICA	S	15	A-E	ICA	C	20	A-E	ICA	L	50								

[*] Joint-submission and assessment plan.   [+] plus Assessment No. 7: A-E, CA, LS, 40.

KEY Topic Areas: A, B, C, D, E = section of the unit
Skill Areas: I = Information, C=Comprehension, A=Analysis, M=Motor Skills
Type of Test: S = Short Answer, L=Long Answer, M=Multiple Choice Questions
C = Course Work, P=Practical Assignment, W=Objective Test
X = Written Assignment

End of unit summative tests are underlined
Each row of data is taken from the assessment plan of a different college

FEU Commentary

Unit assessment plans

Accompanying the statement of aims of a programme and learning objectives of units TEC requires a detailed specification of how the programme and units will be assessed. Colleges making their initial submissions in each programme area were required to design, in detail, assessment plans for each unit, without the benefit of experience of teaching the content of the unit in its new objective format. Many assessment plans therefore, were based, inevitably, on intelligent guesswork. Colleges attempted to respond as best they could often with limited time and resources to the requirements of the TEC programme validation form Val IVA and their interpretation of the TEC Guidance Notes No. 2. TEC firmly placed the responsibility for devising assessment with the colleges, and colleges understood from the appearance of the validation forms and Guidance Notes together with contributions from TEC officers that a detailed specification was required with regular intermittent testing or 'phase-tests'.

An analysis of just a few of the assessment plans shows the enormous diversity in the detail of assessment patterns derived for the same Standard unit, by different colleges. Teachers devised assessment plans based on their analysis of the categories of objectives and skills. In completing assessment plans it appears that some colleges attempted as thorough an analysis as possible devising a plan to which they expected to adhere rigorously, using precisely the assessment methods they selected. Others submitted plans in which they included a number of assessment methods for particular skills and topic areas with the intention of choosing specific methods on implementation.

The diversity in detail of the assessment plans submitted raises the question of whether such variation should be acceptable for Standard units which, in the case of some of the lower level units, may be operational in over 300 colleges, and in

The assessment of learning

Unit assessment plans

104. Each Standard unit includes an Assessment Analysis (or Assessment Specification, both terms have been used by TEC) which illustrates the percentage of marks to be allocated to each topic and skill area identified in the listing of objectives (for an example see Appendix 2). Colleges are required to devise an Assessment Plan for each unit, and submit the plan for all the units in the programme, completing the TEC validation forms Val IVA. (Appendix 3.) TEC requires detail of the number of assessments, the skill areas to be assessed, the types of test to be used, and the marks to be awarded for each component of the total assessment.

105. The documentation of the assessment procedures required a systematic but complex procedure. In addition to Val IVAi which gives the general approach and policy for the assessment of the programme, three forms are required each with numerical weightings which imply a mathematical precision to the decisions made in planning and implementing the assessment process. Thus the Assessment Specification of each Standard unit (eg see Table 15) allocates typically single figure weightings to the knowledge and skills of each topic area and the Assessment Plans Val IVAii completed by the college, also show low (20%) and sometimes single figure weightings (at least in the initial submissions which have been the subject of this study). Finally the Assessment Plan Val IVAiii gives the minimum percentage marks each component contributes to the total for the unit.

106. An illustration of the Assessment Plans (two of which are similar due to a joint-submission) submitted by 12 colleges for the unit Engineering Science II (U75/053) is shown in Table 15. Analysis of similar data for 34 plans for this unit in 34 different programmes further shows the variety of assessment pattern devised and validated. An example of the different patterns is summarised in Table 16.

***Table 16** Assessment patterns (summary) for the Standard unit Engineering Science II (75/053) in 34 different programmes*

a. Number of Assessment points

Number of assessment points	Frequency of occurrence (number of programmes)
7	3
6	14
5	9
4	7
3	1

b. Type of assessment

Assessment mode	Frequency of usage (number of programmes)
short answer questions	34
long (essay/problem) questions	30
multiple choice questions	14
project/practical work/ written assignment	2

Thus within the sample the number of assessment points varies from three to seven. All colleges claim to include short answer questions in their assessment of the unit, but less than half use multiple choice questions, and only a few colleges assess project, practical or written assignments. Four colleges do NOT use long answer (essay or problem solving) questions.

107. The analysis of the assessment details of just one topic area A (Electric Circuits and Measurements) of this TEC Standard unit in the 34 programmes is also revealing (Table 17). Each separate programme submission has its

Table 17 *An illustration of the diversity of practice in assessment plans Engineering Science II (data for 34 colleges).*

Assessment components including topic area A

Topic Areas	Skill Areas	Type of Test	% of Total Assess	Topic Areas	Skill Areas	Type of Test	% of Total Assess	Topic Areas	Skill Areas	Type of Test	% of Total Assess	Topic Areas	Skill Areas	Type of Test	% of Total Assess
A	IC	SL	6	A-E	ICA	SL	40								
A	M	S	5	A-E	MICA	C	25	A-E	MICA	MSL	40				
A-F	MICA	C	40	ABC	ICA	SL	16	A-F	ICA	SL	20				
AB	ICA	S	15	A-E	ICA	C	20	A-E	ICA	L	50				
A	MIC	SM	20												
A	MIC	P	10												
A	M	P	10	A-E	ICA	W	50								
A	MIC	MSLC	20												
AB	MICA	SL	25												
A-E	MCA	P	20	AB	ICA	SL	30								
A-C	MICA	SL	20	A-F	MICA	C	10	A-F	ICA	SL	40				
A	MIC	MSC	15	AB	ICA	MS	18								
A	MIC	MSP	15	A-E	ICA	MSL	40								
AB	IC	MS	15	A-E	ICA	SL	25	AE	MICA	P	25	A-E	ICA	W	10
AB	ICA	ML	15	A-E	MICA	C	20								
AB	ICMA	SL	15	A-E	ICMA	SL	40	A-E	ICMA	CP	20				
AB	MICA	SM	12	A-E	ICA	C	20	A-E	ICA	SL	50				
AB	ICA	MSC	30	A-E	CA	SL	30								
AB	IC	S	10	A-E	ICA	SL	30	A-E	MICA	C	40				
A	MIC	SL	12	A-E	MICA	SL	40								
A	IC	S	20												
A	IC	SL	15	A-E	MICA	C	20								
A	IC	SL	10	A-E	ICAM	C	30								
A	ICM	CP	19	A-E	IC	SLM	20								
A	IC	SL	10	A-E	ICAM	C	30								
A	ICM	CX	20												
A	IC	SM	7	A	M	PC	10								
A	ICM	SMCP	17	A-E	CA	SL	40								
A	ICM	SCM	10	A-E	ICA	SLM	50								
A	ICM	SCM	6	A-E	IS	SL	50								
A	ICM	SCW	12	A-E	ICAM	X	40								
AB	ICMA	S	35	A-E	ICMA	C	15								
AB	ICMA	S	10	A-E	ICMA	C	15	A+E	MIC	P	20	A-E	ICA	SL	40
AB	ICA	S	15	A-E	ICA	L	50								

KEY

Topic areas:
A, B, C, D, E = Section of unit.

Skill areas:
I = Information; C = Comprehension;
A = Analysis; M = Motor skills.

Type of test:
S = Short answer; L = Long answer;
M = Multiple choice questions; C = Course work;
P = Practical assignment; W = Objective test;
X = Written assignment.

Note:
Each row of data is taken from the assessment plan of a different college.

several programmes. Since 1979 TEC have suggested the adoption of 'model' assessment plans, but they have not actually specified which models should apply to particular Standard units, so much variability remains.

On the one hand the involvement of teachers in the design of assessment plans, will result in a beneficial provision arising from their commitment and motivation, providing they have the necessary design skills; and on the other hand one might expect that some measure of agreement, between professional teachers of the same units, might be reached on one or two more valid patterns eliminating some of the idiosyncracies. Where such agreement can be reached the reliability of the assessment of the Standard unit would be enhanced. It would also facilitate the development of relevant validated test material.

TEC's requirement for this detail was to ensure standards, and to facilitate validation of a range of college responses based on teachers' decisions. However the detail has given the impression that decisions about the assessment processes have a precision which previous and present experience show to be unattainable and untenable.

In recognition of the problems inadvertently created, TEC issued further guidance on assessment (Guidance Notes 8) in July 1979 (updated in June 1980). Colleges may now, if they wish, adopt a model assessment plan and minimise at least the work involved in completing the form required for validation purposes. With the assistance of moderators many colleges are reducing the number of assessment points from those in their original plans (see paragraph 277). No doubt had opportunity been available, or made, to throughly pilot the proposed assessment strategies before national implementation many of the teething problems might have been avoided. On the other hand the provision of model assessment plans is likely to take away a significant element of college-based curri-

proposed idiosyncratic assessment pattern for this unit. In 19 of the programmes, in which there is a component assessing topic area A separately from any other topics in the unit, 13 colleges identify a requirement to assess motor skills and 6 do not. This variation must in part be due to a varying interpretation of the term motor skills, defined in TEC Guidance Notes No. 1 as 'the ability to execute some job, physically do some task'. The contribution which the assessment of part A makes to the total assessment of the unit varies from 10 to approximately 25%. In 26 of the 34 programmes, an assessment component can be identified which covers all topic areas of the unit.

108. The time to be allocated for the assessment of this (60 hour – see paragraph 66) Standard unit, which colleges state in their plans varies from 3 hours to 11½ hours. TEC Policy has been to give the colleges flexibility to choose the assessment methods which it believes to be appropriate. Teachers have found that in practice the assessment plans engender numerical precision rather than flexibility. In the words of a moderator *'whilst I agree with flexibility, where TEC asks for a breakdown of marks it is implicit that there is precision because of weightings which are quite fine'*.

culum development which certainly may have been of considerable benefit to those who were involved.

Grades of student achievement

Analysis of the performance of students in a sample of the same Standard units (and some General and Communication Studies 'B' units) shows that overall the percentage of Merits and Pass grades awarded are of the same order. The percentage of Merit grades would not exceed the percentage of Pass grades, if the TEC criterion that a Merit grade is to be awarded for 'an above average performance' is to be upheld. This occurred in two of nine units analysed in association with their respective programmes. The distribution of grades was similar for the Physical Science unit whether it was part of an A5 or B2 programme.

TEC in its 1974 Policy Statement and Guidance uses the terms Pass with Merit, Pass and Fail, but officers of the Council have frequently used the term 'Fail to complete', designated 'X' in computer records. Whilst this term may be accurate in some cases where registered students have not completed the study and assessment components, where students are in effect repeating study of the unit for reassessment we believe teachers prefer the term 'Fail'. The TEC phrase appears unnecessarily ambiguous.

Many teachers have expressed concern about the standards of TEC programmes, in part because of a belief that the TEC assessment philosophy meant students 'could not fail TEC units'. However it is clear that many students do at a particular point in time fail, that is fail to meet the requirements for the grade of Pass or Merit.

Although the overall balance of Merit and Pass grades awarded might be considered acceptable in terms of TEC policy, the balance of grades awarded in any one college may vary widely. Clearly the ability of the students, and the conditions for learning will not be uniform across all the colleges. But the data of this

The achievement of students

109. **Distribution of grades obtained (session 1978-79).** The grades (Pass with Merit (M), Pass (P), Fail (X)) achieved by groups of students of the sample of Standard units in different colleges were analysed taking data from TEC computer records for colleges in the sample pool. Similar data was also obtained for a number of General and Communication Studies units. In calculating percentages students recorded as holding exemptions from the unit were excluded. The mean percentages of students obtaining Merit, Pass and Fail ('fail to complete') grades are shown in Table 18 for each unit, together with the number of colleges for which data was sampled. In the case of Merit and Pass grades the standard deviation is given; in the case of Fail grades the median value is considered to be more informative.

***Table 18** Mean percentages of Merit, Pass and 'Fail' grades for 5 Standard units and General and Communication Studies 'B'*

UNIT (Programme)	No of Colleges	Merit %	SD[b]	Pass %	SD	'Fail'[a] %	Median[c]
Physical Science I (A5) U 75/004	47	40	18·3	49	19·7	11	8
Physical Science I (B2) U 75/004	22	36	26·1	49	24·0	14	16
Engineering Science II (A5) U 76/053 or U 75/037	57	37	20·3	42	22·7	20	16
Chemistry II (C1) U 76/019	16	30	20·7	44	17·5	26	19
Manufacturing Technology III (A5) U 75/056 or U 75/035	31	47	21·5	43	19·3	10	6
Construction Technology III (B2) U 75/075	20	44	23·9	46	25·5	10	7
General and Communication Studies (A5)	64	37	20·5	49	22·8	14	12
General and Communication Studies (B2)	24	48	30·2	34	25·7	12	8
General and Communication Studies (C1)	15	32	25·9	33	21·1	22	13

Notes:

[a] 'Fail' = Fail to complete, category X in TEC notation.

[b] SD = Standard Deviation.

[c] The median rather than the SD is considered to be more usefully descriptive in the case of 'Fail' grades, since a negative % has no practical meaning.

110. The patterns of student achievement are similar across most of the units excepting the notably lower percentages of Merits and the higher percentages of Fail grades in the Standard unit Chemistry II and in the college devised General and Communication Studies (B) units in the C1 programmes. The ratio of Merit to Pass grades varies from 0·7 (Chemistry II) to 1·4 (General and Communication Studies units for B2 programmes). The TEC policy that 'a Merit shall be awarded for an above average performance' implies that the ratio of Merit to Pass grades should not exceed unity.

FEU Commentary

sample indicates the need for careful monitoring of the achievements of students, and of the units and programmes, at individual colleges, through the moderation process. TEC is now monitoring performance on Standard units both locally and centrally and these processes must be regarded as fundamental to the maintenance of standards.

There has been much discussion in TEC committees regarding whether a Distinction grade should be available. Although the issue arose in case study work it was not raised frequently by teachers in the course of data collection. TEC has recently decided to introduce a Distinction grade for exceptional performance, following a survey of opinion advocating its adoption.

Assessment grades in relation to varied Assessment Plans

Comparison of the performance of students at different colleges studying the same unit but with differing assessment patterns, with either no or varying contributions of a summative test to the total assessment did not show any relationship. Such a relationship was reported by a moderator of six colleges who analysed the results for a session (Parker 1979). If student achievement were found to be related to the assessment pattern then the reliability of the assessment procedures would be in doubt. However factors which may influence student performance are many and include in addition to the assessment pattern, the characteristics of individual and groups of student entry, and the experience and skills of particular teachers. Where student numbers are small achievement related to any particular statistical model is unlikely, and it is important that generalised statistical inferences do not interfere with the assessment of well defined performance. It would seem desirable for TEC to monitor and publish data which carefully analyses patterns of student achievement in relation to characteristics of the provision in those cases where an adequate description and analysis of the teaching and learning context can be made.

111. The percentage of Fail ('fail to complete') grades are, in the case of this sample, greater for the Level II units, Engineering Science II and Chemistry II (20 and 26% respectively), than for the Level I Physical Science, Level III, Manufacturing Technology III and Construction Technology III units and the General and Communication Studies units. The Level II units are those to which direct entry can be obtained on the basis of an 'O' level (or 'O' level equivalent) pass.

112. The wide variation in the distribution of the grades awarded in different colleges is noticeable and illustrated in the accompanying histograms for the grade of Merit. (Figure 10 page 49.) For example if the data is combined for all units then, in 113 cases (38%), less than 30% of the students in a particular college were awarded Merit grades and in 24 cases (8%) over 70% of the students were awarded Merits.

113. **Assessment grades in relation to the varied Assessment Plans.** An analysis was undertaken of the assessment grades awarded for a sample of units in relation to the individual Assessment Plans of different colleges. A comparison of the results achieved by students of 95 units across the subject areas Physical Science I (11 units), Manufacturing Technology III (17), Chemistry II (12), Engineering Science II (29), Construction Technology III (6) and General and Communication Studies 'B' (20) showed no obvious relationship between the assessment patterns and the grades awarded. A summary of the data is given in Table 19. Such relationships may be apparent in analysis of the data for a few colleges or by more rigorous statistical analysis of data for a very much larger number of colleges.

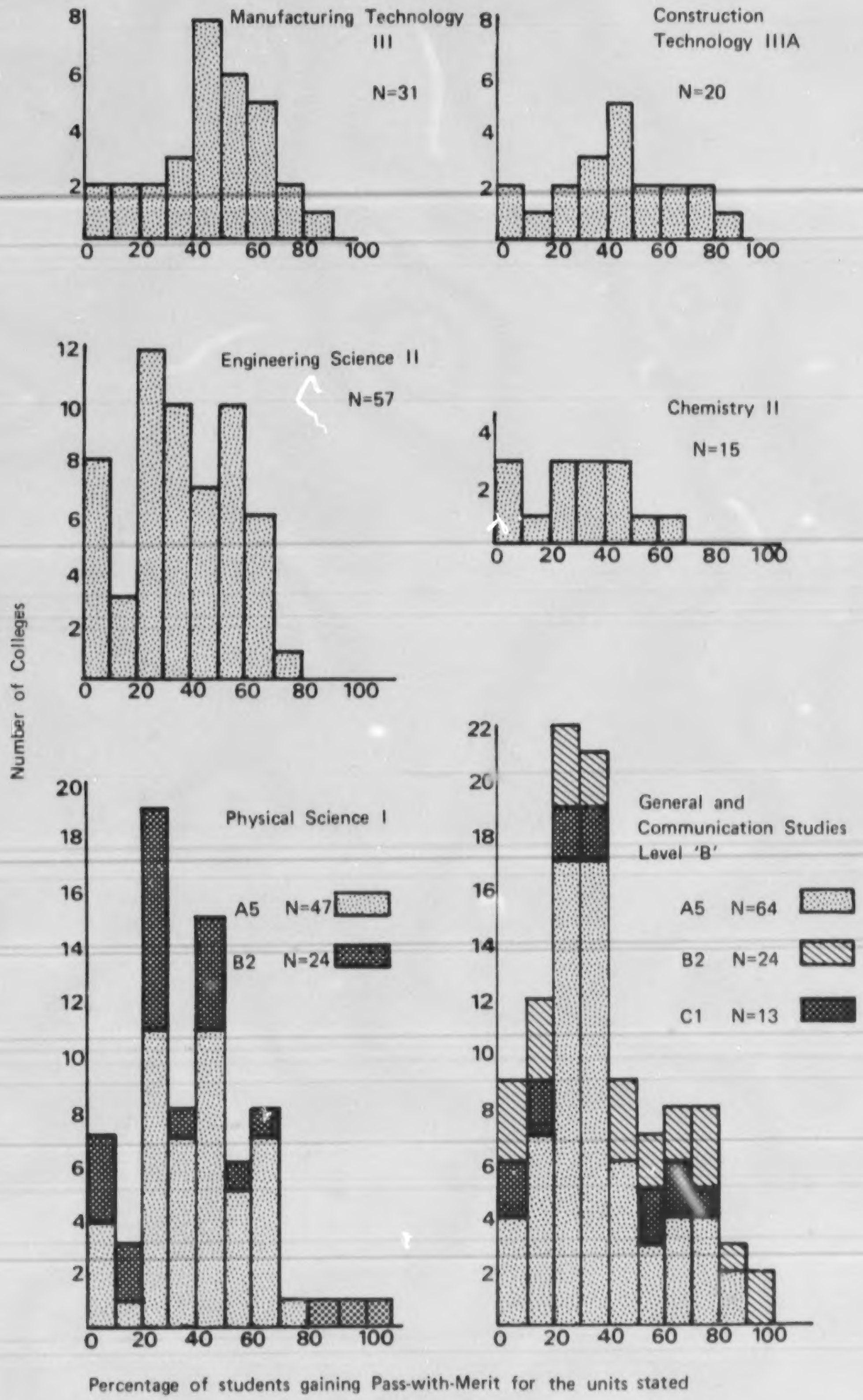
***Table 19** Mean percentage of students gaining 'Merit' and 'Fail' grades for varying contributions of overall unit assessment to the total assessment*

% Contribution from end-of-unit test, or test over all topic areas, to overall assessment	Number of units in the sample	Number of colleges with <10 students	*Average % of Merits awarded		*Average % Failing to complete	
			%	SD	%	SD
0	28	4	38	25	18	20
20	8	2	42	15	13	15
30	13	0	48	20	17	13
40	22	4	39	14	16	15
50	19	1	40	17	16	12
60	5	0	43	18	17	13

SD=Standard Deviation.
* Excludes grades obtained by students in groups of less than 10.

114. **The mode of assessment and examination of students.** Teachers have expressed two general concerns about the assessment process, a. the time demands and burden it makes upon themselves and their colleagues (see eg paragraph 199), b. the need for standards which are recognised nationally (see eg paragraph 274). It seemed important therefore to seek their views (summer 1980) about appropriate modes of assessment in any further development. Their responses, categorised by programme area, to suggested alternative modes of testing and examining Level II and Level III units are given in Table 20.

Figure 10 *The percentage of students gaining Pass-with-Merit grades in different colleges (data for 1978-79 session)*



FEU Commentary

Teachers' preferred mode of assessment

By not examining externally TEC has changed the function of many teachers to include that of internal examiner. Teachers generally believe that their involvement in assessment and examination is likely to lead to 'more successful educational provision' endorsing TEC policy (Policy Statement, 4.7). The majority of those teachers willing to polarise their response also believed that 'the assessment processes were effective in measuring whether students achieve the programme objectives'. The preference by teachers of Science programmes for tests and examinations to be set and marked by themselves is consonant with these findings. The majority preference by teachers of Mechanical Engineering programmes for units at Level III to be assessed externally can be attributed to two factors. Firstly their concern about standards, many of them having seen external examinations replaced by a new system which at the present stage of development does not give them confidence that standards will be adequately similar from college to college. Consequently many prefer some form of external assessment at 'critical points' in the programme. Secondly, the increase in the proportion of their workload which they spend on activities associated with the assessment function. It is likely that the two factors weigh differently in the minds of different teachers. Teachers of Building Studies programmes held an intermediate position. That more teachers of all these programmes expressed greater favour with external assessment for the Level III rather than the Level II units indicates their concern that programmes should have a national currency. Problems in operating continuous assessment systems are well known and were summarised in a study of CSE schemes as the 'difficulty of consistently adhering to a standard' and 'the amount of work involved both in teaching and moderating' (Hoste and Bloomfield, 1975).

***Table 20** Teachers' opinion of the preferred mode of assessment in any further development of TEC programmes*

	Units at Level II			Units at Level III		
Percentage of teachers who believe that 'as far as possible tests and examinations should be:	C1 N=63	B2 N=39	A5 N=205	C1 N=63	B2 N=39	A5 N=205
set and marked by staff of this college	65	62	44	51	31	21
set by staff of this college and marked externally	5	5	3	6	10	3
set externally in the region and marked by staff of this college	2	3	5	3	8	2
set externally in the region and marked externally	5	8	15	5	0	13
set nationally by TEC and marked by staff of this college	3	3	3	3	8	4
set nationally by TEC and marked nationally'	14	10	25	24	33	48
more than one response	1	5	1	2	3	1
no response	4	5	5	6	8	6

Firstly, with respect to units at Level II teachers (over 60%) of Science C1, and Building Studies B2, programmes favour tests and examination to be set and marked by college staff. This is also the greatest of any of the categories of responses by teachers of Mechanical Engineering A5 programmes (44% expressing this view), although 40% favoured tests and examinations set and marked externally, either in the region or nationally.

115. In the case of Level III units there was a significant difference in response by teachers of the different programme areas. Teachers (51%) of C1 programmes again prefer tests and examinations to be set and marked by college staff, although a substantial number (29%) would prefer tests and examinations set and marked nationally (24%) or regionally (5%). Teachers of A5 programmes expressed the contrary view: almost 3 times as many expressing a preference for national or regional provision rather than tests and examinations to be set and marked by college staff. Teachers of B2 programmes were roughly evenly divided in their opinion in this respect.

116. **Teachers expressed the views**

a. that 'education is likely to be more successful if the teacher is involved in the assessment and examination of the students' (ratio of teachers strongly agreeing or agreeing to those disagreeing or strongly disagreeing: C1 programmes 10:1, B2 9:1, A5 6:1);

b. that 'the new TEC programme has assessment processes which are effective in measuring whether or not students achieve the programme objective' teachers of C1 programmes 4:1, B2 5:1, A5 3:1. (A substantial number, similar across all programmes (average 24%) preferred to remain neutral in the latter case.)

'Despite some misgivings expressed by Vice-Principals/Heads of Department/TEC Co-ordinators about the work load because of continuous assessment, the teachers (and their students) prefer the TEC assessment system' (Members of the evaluation team – Part 2B).

FEU Commentary

Criteria for success

Any assessment system requires criteria or standards against which to judge and grade the learner's performance. In previous technician courses, as in most courses, the criteria, often not explicit, were based on the experience of results of earlier years and the accompanying expectations, ie norm referenced. In the case of large populations and external examinations, students were ranked and decisions made, based on a norm about the percentage of students who would be successful. The performance of candidates was compared with that of previous groups in this norm-referenced approach. TEC however introduced a policy that the assessment of learning should be closely related to the objectives of the units, and that the assessment is only valid if designed to test whether identifiable objectives have been achieved. The TEC criterion for the grade of Pass is stated as follows:

'a. For a unit which is a pre-requisite for other units at a higher level, the students should have mastered those objectives which are essential for them to make proper progress in the units at the next level. b. For a unit which is at the highest level in a programme . . . the students should have achieved the aims of the unit as a whole'. (TEC Guidance Notes No. 3.)

Thus the criterion for Pass is mastery of essential objectives – a criterion-referenced approach. The onus of responsibility in defining which objectives are essential is left to the college. The Standard units do not distinguish those objectives considered as essential and we are not aware of colleges making any such distinction explicit.

A feature of a mastery learning approach is regular testing, with remedial or additional learning activities and retesting as necessary, to enable individual students to demonstrate their achievement of the essential objectives. In principle there should be no limit to the learning time available. Only when a student has mastered the essential objectives necessary before the next stage of learning can he proceed. In this way the TEC policy might be realised that 'while the standards of awards should be high, a student who meets the admission requirements for a programme and works reasonably hard and well should be entitled to expect that he will be successful in his studies' (Policy Statement 2.5). Many of the earlier programme submissions specified six or more assessment points in each unit. This would be consistent with a mastery learning approach. However many colleges have found the organisational and resource demands too great to successfully change from a previous grouped pace learning approach to a new provision which conceptually caters for individual learning and achievement rates.

TEC policy whilst encouraging a criterion-referenced approach which relates the standards of a unit to the achievement of objectives, also allows a norm-referenced approach by acknowledging that carefully designed tests can discriminate between student levels of achievement with a grade of Pass for a mark of around 50% and of Pass with Merit for a mark around 65%. (TEC Guidance Notes No. 3.) There is a conflict between on the one hand a requirement for mastery of essential objectives and on the other discriminating between levels of achievement. This conflict is not always apparent to the teacher.

The more recent Guidance Notes (No. 8) endorsed the alternative stances to the assessment policy. 'Either students may demonstrate mastery of certain specified objectives', or 'show appropriate level of achievement averaged over a block of objectives'. The latter approach is acknowledged, by TEC as that 'most commonly used in TEC programmes'.

The Assessment Plans provide a way of systematically assessing a range of objectives. However, if TEC wishes to argue that a criterion-referenced approach will enable appropriate standards to be achieved, then it would be appropriate in collaboration with colleges to identify those objectives which are considered to be essential. The emphasis in present practice more closely resembles the pattern conventional in many courses. That is to say, a Pass is awarded for about half of the learning achievement possible for the objectives as a whole (some objectives being achieved totally, and others not at all), and a Pass with Merit for 65% achievement of a total possible performance. In this way it is possible to meet the traditional requirements of employers and other educational bodies and indicate the relative achievement of students.

Specification of the curriculum – the inclusion of teaching and learning experiences

TEC policy has given particular emphasis to the definition of aims, learning objectives and assessment methods. In so doing the *ends* to be achieved have been stressed and relatively well-defined. In contrast there has been no requirement for statements of teaching methods or learning activities – the *means* necessary for these ends to be achieved. (The only comment is a reminder in the rubric of every Standard unit that 'practical work could be the most appropriate teaching method for the achievement of the objectives'.)

In designing the early TEC units in 1975 and 1976 there was obviously little time to undertake the detailed curriculum thinking necessary to explore the relationship between objectives and teaching and learning experiences. The early developments were undertaken without a research and development base. With hindsight this lack of priority for trial of the new proposals, and opportunity for reflection was a grave deficiency. TEC in response to the conventional pressures recognised that teachers corporately tend to reject professional guidance and made its policy accordingly that 'the Council will not be prescribing what teaching methods should be adopted for TEC programmes, recognising that these are bound to vary considerably according to the nature of the programme and the resources available in colleges'.

FEU Commentary

However stating specific objectives and associated assessment requirements without considering teaching and learning experiences at the design stage is likely to lead to a less than optimum design and specification of the curriculum, and also to undue constraints at the implementation stage. Learning experiences which previous experience might suggest would be of value may never be realised. 'A curriculum is a thing in balance, which cannot be developed first for content, then for teaching method, then for some other particular feature' (Bruner, 1966).

Further argument for including teaching and learning experiences arises from the general aims and policy statements of TEC. For example TEC Circular 3/75 requires that 'Every programme should aim to develop the student's *ability to think*, to *grasp ideas*, and *to communicate effectively. Adaptability, curiosity, self confidence, independence of thought* and *power to make critical judgements* are personal qualities that are given every encouragement to grow'. TEC has also stated that 'the student must be guided towards discovery and understanding of the principles which underlie his specialism' (TEC Circular 3/75). It is difficult to write objectives which relate to these aims and philosophies. A teacher who concentrates solely on helping the student to achieve the objectives of units which are heavily orientated towards Information and Comprehension learning may inadvertently restrict his methods in ways unlikely to develop the students with respect to these broad aims. This risk might be minimised if the curriculum statements were to include learning experiences likely to facilitate the development of these broader programme aims whilst at the same time providing opportunity for the unit objectives to be achieved. This tension between meeting the aims of TEC Circular 3/75 and the specific objectives of the units has been discussed in support materials on teaching methods, with particular reference to their relationship with objectives in TEC programmes. (Staff Development and Educational Methods Unit, Manchester Polytechnic, 1979.)

The TEC approach to curriculum development appears largely to have excluded a consideration of teaching and learning strategies and experiences at the design stage. A curriculum model is preferred which implies a dynamic inter-relationship between the curriculum elements: objectives, teaching and learning methods, subject matter and assessment methods in the realisation of curriculum aims (paragraph 12). To make decisions in any one of these areas is likely to constrain the subsequent practice on implementation. This has been the case in the implementation of TEC Standard units. The main design specification has resulted in teachers giving a major proportion of their time to preparing tests, testing students and recording and following their progress. Whilst these are essential activities in the management of learning and many teachers have indicated their belief that the assessment processes are effective, they continually emphasise the demands the process has made upon them and this has left them relatively little time to consider the most appropriate teaching and learning experiences. This study shows that teachers have attempted to implement the specified features of the curriculum as documented in so far as their experience, time and resources allowed them. In fact their attention to those curriculum elements which are specified takes precedence to those unspecified.

To include, in the curriculum statement, examples of teaching and learning activities considered appropriate by unit designers would assist the teacher to overcome some of the limitations inherent in a curriculum presented solely in an objective format. A prime role of the teacher is to mediate the curriculum to the abilities and needs of individual students. An illustration of learning experiences should enhance rather than restrict the teachers' professional role, and the quality of the learning experiences.

CHAPTER 5

The Curriculum Development Process

Development at the National Level

The Role of the Regional Advisory Councils and Examining Bodies

Development in the Colleges
- **Analysis of needs**
- **Design features**
- **Implementation**
- **Evaluation**

Factors helping and hindering the development process

Staff Development

Resources for Curriculum Development

Other outcomes

The initiation of TEC programmes following the setting up of the Council is briefly considered, and some of the apparent assumptions in TEC policy identified. The main focus is the response by colleges to the policies and requirements of TEC.

The analysis and design stages of programme development are considered, with analysis of practice as documented in programme submissions to the Council and portrayal of teacher involvement. Experience of the development of inter-college programmes is described. Problems and practices occurring on programme implementation are illustrated with particular reference to the work activities of teachers and an organisational viewpoint, related curriculum issues being considered in Chapter 4. Much of the findings are interpreted in relation to the adoption of a unit programme structure. Factors helping and hindering the development process are identified. A section on evaluation includes the process of moderation, teachers' perceptions of aspects overlooked in development and changes made and needed, and a brief consideration of other aspects of programme review.

Finally Staff Development issues and Resources needed for Curriculum Development are considered.

FEU Commentary

The establishment of TEC

The Haslegrave Report advised on the consultations required at national and regional levels, and on course structures and student assessment in the setting up of a new system of technician education. However it did not consider the organisational and resource implications of the changes for the colleges or how the changes might be effected – this was not part of its brief. Hence TEC began without guidance in this respect.

In general the Haslegrave Report appears to have been enthusiastically received by those responsible for the education of technicians. Expectations of change were aroused amongst senior staff of colleges and members of the Regional Advisory Councils and examining bodies and many of them referred to the unfortunate delay between the issuing of the Report and the appointment of the Council.

Development at the National Level

The Establishment of TEC – The Haslegrave Report

117. The Report of the Committee on Technician Courses and Examinations (Haslegrave Report) was published in December 1969. In an article about the report Dr Haslegrave (1970) writes of the desires of the large number of bodies and individuals which contributed evidence, and which the report reflects. These included:

> 'a desire by teachers to be involved closely in the design of courses and syllabuses in selection of students, in examining and making awards';
>
> 'a desire by persons engaged in industry, business and commerce that academic studies should be related more closely than at present to the work being carried out';
>
> Evidence was presented that
>
> 'educationalists and LEAs deplore the multiplication that exists of qualifications, and of bodies undertaking examinations';
>
> 'students dislike the discrimination that exists between national certificates and City and Guilds certificates, the distinction between national certificates and national diploma awards that rest very much on whether attendance is full or part-time. They feel that the work carried out during studies ought to play a more important part in making awards than it does now. The need to have better means than exist now for a student to transfer from one course to other courses was emphasised repeatedly.'

118. The National Advisory Council on Education for Industry and Commerce (NACEIC) who appointed the Committee resolved in July 1970 to

FEU Commentary

The wide range of programmes to be provided under the TEC umbrella, and the large number of teachers, students, employers and professional institutions to be involved meant that the setting up of the Council was, perhaps, the most far reaching planned change in curriculum validation and examination ever attempted in the United Kingdom. Changes of a comparable nature but affecting few institutions have been the establishment of the Council for National Academic Awards and the Open University.

Radical curriculum change

The implementation of the Haslegrave proposals through the subsequent policies of the Technician Education Council has meant radical change. In characterising types of educational change Becher and Kogan (1980) have characterised radical change as focusing primarily on values and only secondarily on forms of organisation or patterns of activity. They distinguish between radical and evolutionary change by associating with the latter the maintenance of continuity of values in one direction whilst introducing a significant discontinuity in another. TEC has been and continues to be concerned to maintain a continuity of standards associated with national awards, although wishing to determine the standard appropriate for its own awards.

In other respects the changes represent a radical departure from the previous provision in a number of directions. For example TEC policies have required:
changes in the administrative structure – the replacement of a dual system of awards, of National Certificate and Diploma, and CGLI and other regional technician qualifications;
changes in curriculum structure – the preferred unit programme structure including 15% General and Communication Studies;
changes in the method of expression of curriculum content, the use of

recommend the Secretary of State to approve its major recommendations. However the period of consultation between the Department of Education and Science and the City and Guilds of London Institute regarding the administrative servicing of TEC, and negotiations with the many professional and other interests involved in the joint committees for National Certificate and Diploma Awards took almost a further three years before the Council was formed and the first members appointed in March 1973. In the words of a Council Member *'the delay between the Haslegrave Report and the establishment of TEC was a great disservice to TEC . . . without the delay TEC would have been got out before the economic blizzard'.*

The more innovative staff in some colleges wishing to make changes to their courses found this period frustrating.

The initial work of the Council and its committees

119. At its first meeting on 27 March 1973 the Council set up two working parties, the Education Policy Working Party and the Resources and Organisation Working Party which subsequently became the Education Committee and Resources and Organisation Committee.

120. The Council quickly produced a Preliminary Statement (October 1973) which announced some initial policy decisions on the range of awards and the way in which it would operate.

The following extract illustrates the early thinking of the Council.

'The Council will be principally concerned with setting standards, awarding qualifications and promoting advances in technician education, thus enhancing the status of technicians. Although it will always be concerned with arrangements for assessing students it does not see itself as primarily an examining body. The Council intends that flexibility should be a basic feature of its schemes, covering both entry qualifications, methods of assessment and course structures. . . . Structures built on units and a credit system for gaining qualifications will play an essential role in these arrangements. . . . While the Council has a national responsibility for establishing and maintaining standards . . . it believes that any form of education is likely to be more successful if the teacher has a sufficient measure of control over what he teaches and is involved in its assessment. The Council intends that wherever possible there should be freedom of the colleges in co-operation with industry to plan and operate their own programmes within the Council's guidelines.'

121. A Consultative Document followed, in November 1973, setting out proposals for the Council's structure of Sector and Programme Committees which would have responsibility for developing and validating programmes over broad fields of technician employment. Consultation resulted in a reduction of Programme Committees from thirty to twenty-two. Subsequently in June 1974 a comprehensive Policy Statement was issued. This indicated that the Council expected to see major developments in the implementation of courses to begin in September 1976.

learning objectives being strongly preferred;
changes in curriculum content, requiring colleges and teachers to be responsible for justifying the curriculum content in relation to the needs of local employers and students;
changes in teaching approaches to include more informal methods;
changes in assessment procedures, requiring teachers to be responsible for planning assessment and testing their own students.

The intended changes were clearly very substantial. It should be remembered that the structural changes which have occurred to date have done so in the context of an evolutionary rather than radical change in central administrative structure. Much of the style and practice of recording and monitoring the provision has evolved from the previous administrative practices and experiences of the staff of the CGLI. Radical changes in policy within an evolutionary change in administrative structure are likely to cause organisational problems and so it is not surprising that, with limited resources, these have been experienced both centrally and in colleges.

The deliberations of curriculum development agencies can often be interpreted in terms of an innovation model which includes stages of problem identification and definition, innovation planning (project planning), innovation programming and development, experimentation, evaluation and revision, dissemination and production, implementation (CERI, 1973), perhaps more simply known as a Planning Research, Development, Diffusion Model. TEC appear in the early years to have omitted the necessary stages of trial of new processes and formative evaluation before being willing for widescale adoption to occur – a strategy of getting it right the first time. TEC found it necessary to use its limited resources largely to establish the mechanisms necessary to validate curriculum statements (programmes) from over 500 colleges rather than for curriculum research.

FEU Commentary

Resources for development work

The resources terms of the deficiency grant made available to TEC did not provide for systematic major curriculum research and development work. On the one hand the magnitude of the curriculum change, as distinct from the administrative change to the existing course provision, which would emanate from the implementation of the Haslegrave Report appears not to have been anticipated. On the other hand in seeking to make fundamental changes the new Council and its Committees appear to have generated little pressure for extra funding for the development work required in their interpretation of the task. This may in part be due to the inability of newly appointed bodies to successfully formulate immediate financial demands.

Whilst the Open University and TEC are engaged in very different curriculum provision it is nevertheless instructive to compare the relative (revenue) resources allocated for the development of an entirely new provision (the Open University) with those made available to that (TEC) replacing an existing one. It appears to be more difficult to justify and allocate resources for what might be equally necessary innovation to meet the needs of students.

Some assumptions in TEC policies

The TEC Policy Statement of June 1974 is a clear, authoritative, and definitive presentation of the intentions of the Council. However it emphasises organisational and administrative rather than pedagogical matters and provides little explicit rationale for many of the policy decisions. For example there are statements about the number of units in a programme and the expected study time, but little explanation of the advantages or reasons for adopting a unit-based curriculum structure. Similarly little argument is given for the preference for an objectives approach to curriculum design, although this is developed in a later Circular (paragraph 58). The Policy Statement is likely to appeal

122. TEC was granted financial support from the Exchequer until it generated sufficient income from student fees. It understood that this should occur at as early a date as possible and that the new system should be 'at little or no extra cost (always allowing for inflation)' (TEC NEWS No 1, February 1975). It appears that TEC accepted the need to develop the new provision with the minimum of cost and minimum of full-time staff (Hanrott 1976).

123. Some comparative financial data and student numbers for the formative years of TEC, and the Open University, OU, are given in Table 21.

Table 21 *Comparative data for the formative years of TEC, and the Open University*

	TEC	OU
Date of first meeting of Council (Senate)	March 1973	January 1969*
Income from Government Grant in first 'year' of operation	£97,281 (Oct 73 – March 74)	£937,000 (June 69 – March 70)
Income from Government Grant during first 5 years	£1,808,927	£26,453,438
Income from Student fees during 5th year of operation	£296,247	£1,180,000
Income from Government in 5th year of operation	£666,969 (1977-78)	£9,967,000 (1973)
Number of students registered in 5th year of operation	33,831	38,424

(TEC and OU data from Annual Reports are not adjusted to take account of inflation.)

* The planning committee met prior to 1969.

FEU Commentary

more to an administrator than teacher who might find the style prescriptive and its implementation not as straightforward as perhaps implied.

The trend towards more teacher participation in curriculum decision making developed during the 1960s both in the schools in CSE developments and in HE in the courses validated by the CNAA.

Although individual members of the TEC were aware of the pressure upon teachers and the need for staff training, the skills required for curriculum development work and the extent to which they were available were not fully considered. Programmes of teacher development were not perceived as a systematic part of curriculum development.

Evidence in this study indicates many teachers need training support and guidance to enable them to understand and operate the TEC assessment procedures effectively. Whilst TEC acknowledged the 'heavy demands on staff and other resources' (Policy Statement 3.3) involved in curriculum development, the magnitude of the task appears to have been under-estimated.

TEC does not appear to have presented evidence supporting its proposals received during the consultative period, which might have enhanced teachers' perceptions of their viability.

Teachers, and they believe employers share their view, have found it difficult to reconcile their concept of national standards being associated with a statement by TEC (paragraph 124d), derived from the Haslegrave Report, which implies effort itself should be rewarded.

In the early years in those colleges in which several programmes were developed, departments tended to carry out their development work fairly independently.

Liaison between colleges is constrained by the existing commitments of individual teachers, the time required and general staff resources available.

Some assumptions implicit in the TEC policy documentation

124. An analysis of the 1974 TEC Policy Statement, Circulars (1/75-16/75) and Guidance Notes (1-3) suggests that among the assumptions which TEC made about the context in which the new programmes were being developed were the following:

About the teachers, their skills and attitudes

a. the teaching profession in FE wished to accept much more responsibility for its own academic decisions [in fact the Haslegrave Committee had received evidence to this effect (Haslegrave 1970)];

b. the teachers can attain the necessary skills in organisation, curriculum planning and development and student assessment. For example 'The Council believes that wherever possible teachers should be involved in the assessment of their students' (Policy Statement 3.2). It is clearly expected that teachers possess or will develop skills which allow them to submit units for validation containing
   i. an analysis relating the content and balance of the assessment to the content of the unit, whether or not the unit is in objective form;
   ii. the methods proposed for assessing the unit, these being related to the assessment analysis;
   iii. a statement giving the criteria for determining the grade of success of the student in the assessment (TEC Guidance Notes No 2, paragraph 2);

c. teachers and colleges are likely to be receptive towards the new proposals;

d. teachers can interpret such phrases as 'the standard of the award should be high . . . [but TEC] does not wish the requirement for obtaining an award to be unnecessarily demanding' and 'a student who meets the admission requirements for a programme and studies reasonably hard and well should be entitled to expect that he will be successful in his studies' (Policy Statement 2.5).

125. About the colleges, their organisation and structures

e. teachers and college departments are willing and able to co-operate together across subject boundaries. Students are meant to study the various units of their programme avoiding 'fragmentation of learning';

f. the college organisation has a flexibility which allows liaison within the structure of the college administrative boundaries and the various outside agencies identified;

FEU Commentary

From the teachers' viewpoint curriculum development takes place within the constraints imposed by the authority structure of the college and resources provided by the LEA.

Teachers believe with some justification that, but for their time and enthusiasm, TEC programmes could not have been implemented.

g. the course of control and responsibility for curriculum development is clear;

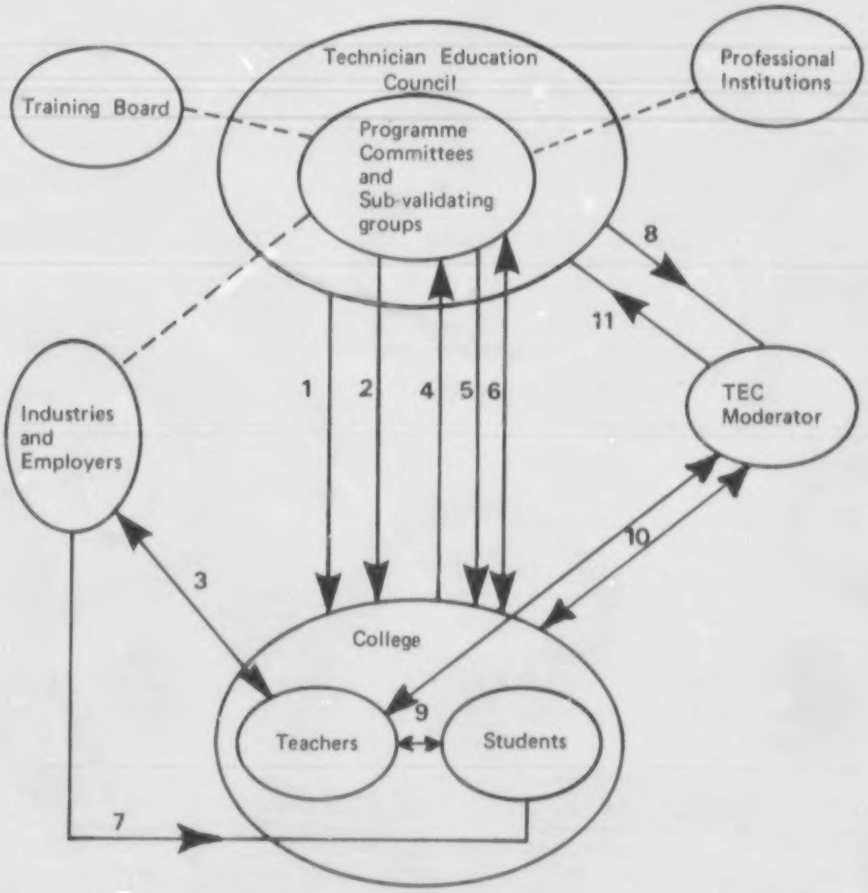
h. time is available or can be made available for curriculum planning and development.

The procedures of TEC programme development and validation

126. During the years 1974-76 TEC (a) established the initial central system for administering the various communications between the Council, its Committees and administrative services (provided by the CGLI) and the colleges; (b) issued the first policy Circulars, Guidance Notes and Validation Forms for completion by colleges; (c) provided through its Programme Committees, model 'Standard Programmes' and Standard units for adoption by those colleges which wished to demonstrate their relevance for the students in the college's locality.

The principal stages in the process of programme development and validation (programmes validated from 1975-78 which are the subject of this report) are shown diagrammatically in Figure 11 and summarised below.

Figure 11 *The TEC programme development and validation process*



Technician Education Council
Programme Committees and Sub-validating groups
Training Board
Professional Institutions
Industries and Employers
TEC Moderator
College
Teachers
Students
1
2
3
4
5
6
7
8
9
10
11

FEU Commentary

Membership of TEC committees

Members of TEC committees appear to have been chosen as a consequence of the positions they held in their full-time occupations, and their associated experience. Whilst invited as individuals, collectively the total membership aims to reflect a balance of relevant professional and technical expertise. Proven skills in curriculum development do not appear to be a principal criterion for selection. Various parties (eg representative of NATFHE, members of HMI), have commented that the Programme Committees did not include a sufficient number of classroom teachers. However it should be recognised that most teachers with normal teaching loads would have little experience of curriculum development at the initiation of TEC developments.

127. **Initiatives at TEC**

1. TEC provides the Policy Statement, policy Circulars and Guidance Notes (the newsletter TEC NEWS is also circulated to colleges) (paragraphs 119-121).
2. TEC Programme Committee develops and makes available Programme Guidelines, with examples of Standard (model) programmes and Standard units (paragraphs 131-134).

128. **Initiatives by the college**

3. College designs a programme with or without the collaboration of other colleges, but in consultation with local employers of technicians. College adopts 'Standard' programme and units in all or part with justification, or designs its own programme and units (paragraphs 143-198).
4. College completes TEC validation forms and submits programme to TEC (paragraphs 162-173 present an analysis of a sample of such programmes).

129. **Programme validation**

5. Programme Committee sub-group, serviced by TEC Advisory Officer and Administrative Officer validate and approve (usually conditionally subject to requirements for amendment) or possibly reject the programme.
6. Advisory Officer communicates decisions of the validation group to the college on behalf of the Council and in the name of the Programme Committee. College attends to requirements, where necessary and obtains final approval from TEC.

130. **Programme implementation**

7. Following conditional or unconditional approval, college enrols students and organises the curriculum.
8. TEC appoints programme moderator.
9. Teachers organise teaching of units and assess student achievement.
10. Teachers liaise with external part-time or full-time moderator, formally on three occasions during the year. Moderator monitors student achievement and the programme in operation, and agrees the grades to be awarded to students (paragraphs 262-272).
11. Moderator reports to TEC. In addition college completes TEC forms to register students, and Student Unit Report forms at the end of each year.

Sector and programme committees

131. Three Sector Committees (A, Engineering programmes, B, Building and associated programmes and C, Science programmes) were established with responsibilities for interpreting the Council's policies for the Sector, co-ordinating, rationalising and reviewing the work of the constituent Programme Committees.

Among the Programme Committees' principal responsibilities were: to provide guidelines on admission requirements, programme structure, methods of assessment, resources; to validate individual and grouped (joint) college proposals for programmes; and to approve or appoint external moderators (see Appendix II of the TEC Policy Statement). Specialist Panels were established to give specialist advice on curriculum aspects apertaining to several committees (eg Terotechnology, Mathematics). A specialist panel for General and Communication Studies was not established originally, but was added in 1976, in response to the demands of teacher specialists in this area.

The programme committees were allowed considerable autonomy, and it was evident at the DES Engineering Summer School in 1976, through contributions of individual Programme Committee chairmen that interpretations, of how the needs might be met and appropriate programmes developed, varied across the committees.

FEU Commentary

The structure of the programmes

The example programmes in the TEC Policy Statement and model Certificate programmes proposed by A5, B2 and C1 Programme Committees are based exclusively on a 15 unit structure for entrants gaining no credit exemptions. Although the TEC policy was to have flexibility in the number of units comprising a programme, and the possibility of 12 units was discussed quite often around 1975, the colleges rapidly adopted the perceived normal practice. Whilst this provides a uniformity for the validation process, it is interesting to speculate, that had examples of a 12 unit structure been given, this would have been adopted. The formal statements made by a national curriculum validating agency can clearly influence outcomes dramatically. It is worth noting that a 12 unit structure would have been administratively simpler.

The workshop enabled TEC to issue standard units in late 1975. It is unfortunate that there was no opportunity for small scale trial and revision of the units before national issue. Limitations in the quality of the units to which teachers have drawn attention can be attributed to their rapid design rather than systematic development.

The validation of programmes

The Advisory Officer has a most significant role in his interaction with members of a Programme Committee. Russell (FEU Project Report No 8, 1981) has identified the changing role of officers of central curriculum and examination agencies as moving from that of 'servant of the committee towards one as a professional in the system with deep understanding of the process of curriculum design and development'.

The speed and haste of early TEC developments with few full-time professional staff led to Programme Committees developing their own interpretation of policies before substantial co-ordinating principles were established by the Sector Committees. The autonomy allowed

Development of standard programmes and units

132. Programme Committees separately produced model programme structures and guidelines, being provided with a structural framework by TEC officers. The guidelines from the A5, B2 and C1 committees for the Certificate programmes illustrate the variations introduced by the different committees.

133. TEC offered colleges the possibility of designing their own programmes for submission and approval but realised that 'this could place heavy demands on staff time and resources' and that 'it would be wasteful for large numbers of staff in separate colleges to spend valuable time developing common studies and other material which could be produced in a standard form' (TEC Policy Statement 3.3). The Council decided to design Standard units in learning objective format.

134. The task of writing the initial units in objective format was tackled by inviting teachers from the colleges and armed services' educational schools to take part in a four day residential curriculum workshop in September 1975. About 140 people were involved, who were either known or recommended to TEC officers as experienced in the required technical areas and/or writing behavioural objectives. Members were paid travelling and subsistence expenses but not a fee. At the workshop most members, grouped according to their subject expertise in small teams, began the task of writing units in behavioural objective format calling upon their experience of teaching technician courses. They were provided with a summary of unit content as a list of subject matter originating from TEC Programme Committees or their working parties. As sections of each unit were drafted a small team of 'checkers' who had greater experience of writing objectives, but possibly limited experience of the subject matter in question, fed back to the groups comments and advice on necessary improvements, revision and redrafting. In the opinion of a member of the workshop whilst it was an advantageous use of the available manpower, a good deal of 'learning on the job' occurred. The workshop produced some 90 units in initial draft form for further consideration by TEC Advisory Officers and appropriate Programme Committees before publication as Standard units before the end of the year. Other units were in the opinion of members of the checking team *'in no more than a very rough form with much further work needed'*.

The validation of programmes

135. Programmes received from colleges are scrutinised by an appropriate TEC Advisory Officer who makes a report to the programme validation committee. Initially these were meetings of the members of the Programme Committee or a sub-group. As members grew in experience, other teachers with experience of programmes in the colleges were brought into validation groups. The Advisory Officer draws the attention of members to points in conflict with his interpretation, and the committee's previous interpretation and evolution of policy.

136. College response to the timetable for first validation of new programmes meant a heavy validation load. In preparation for the start of the 1977-78 academic year, A5 and B2 committees considered as many as eight programmes in one day. The problems of validating many programmes in a relatively short space of time are illustrated by the comment of a Programme Committee member *'many assessment grids get scant attention, they slipped through the net'*, and a TEC officer, *'things get through which shouldn't have done'*. On many occasions teachers and managers have spoken of the *'undue haste'* with which the initial TEC programmes were got off the ground.

137. The workload of the committees is further shown by the response of an Advisory officer, in 1979, when teachers sought guidance on making amendments to validated programmes. *'TEC cannot react immediately*

the Programme Committees, was in accordance with the policy of flexibility in the design of programmes for a wide range of technician occupations. The consequential non-uniformity of validation of similar units by different committees caused anxieties in the colleges and might have been avoided had a more phased introduction been planned.

The Regional Advisory Councils and Examining Bodies

TEC's preference for a direct relationship between individual or groups of colleges may be attributed to two factors: firstly its desire to develop a system in which the awards had a distinctly national identity, secondly a concern to be primarily a curriculum validating and not an examining body. By establishing its independence of the Regional bodies for the procedures of validaton and assessment, TEC minimised the influence of the old on the new provision. On the one hand to establish new structures and practices was consistent with the innovatory stance of the Council, on the other to choose not to build on the existing practice lost good-will and the opportunity to use existing mechanisms.

because of the load on our system – it is better to submit a lot of combinations for approval, then there are no problems.' Teachers also expressed their anxieties about programme validation, observing for example that *'an assessment schedule rejected by one TEC programme committee was accepted by another'.*

138. Following experience of validation of the initial submissions for 1976 starts, TEC sought the views of colleges on the validation procedures. In particular colleges criticised the amount of 'paperwork' and validation form-filling involved. Whilst retaining the basic requirements and approach TEC modified the validation forms for colleges making submission for 1977 starts to take account of both their own and college experience and some of the criticisms (TEC Circular 3/76).

The role of the Regional Advisory Councils and Examining Bodies

139. The Haslegrave Report recommended 'a substantial and positive role for the regional examining organisations. Under such arrangements the planning of certain courses and the conduct of examinations could be operated from regional organisations subject to policy directions by the Council. For other courses and examinations the work could be undertaken partly at the centre and partly in the regions'.

In contrast to most other recommendations of the Report, TEC did not adopt this proposal, although 'while the Council does not envisage the regional organisations (the Regional Advisory Councils and the Regional Examining Bodies) acting on its behalf in the areas of validation and assessment, it is confident that they can contribute to the success of its schemes by carrying out many other activities in the support of the colleges and local authorities in their areas' (TEC Policy Statement, 8).

140. The role of the Regional Advisory Councils and Examining Bodies in the TEC provision was discussed with officers of these organisations during the earlier part of this study (1978). In general the regional organisations regretted the TEC's decision not to evolve their existing role in the examination of technician students as an integral part of the new provision. By choosing not to use existing regional structures TEC potentially lost an opportunity of a. building on the assessment services in those regions where they were already available, b. avoiding possible duplication in development work or in the overlap of provision.

141. Discussion with officers of the Regional bodies identified some of the principal concerns voiced in the regions during the development of programmes. Some of the opinions expressed most frequently were that

a. resources needed for the introduction of TEC programmes had been underestimated,
b. developments were being undertaken in too much of a rush,
c. industry 'doesn't know what TEC is about', and 'isn't sure what it requires'. Smaller firms have particular difficulties,
d. the changes had generated a great deal of uncertainty for college teachers and 'alarming' administrative demands.

142. The Regional Advisory Councils, both through their structure of committees and less formally, have generally played a substantial role in assisting the process of developing TEC programmes: for example, by bringing staff together in curriculum development groups, hosting and assisting the organisation of conferences to inform teachers of TEC requirements and to develop necessary skills. Inevitably this has taken place within a climate of limited resources, and Regional officers identified the need for more extensive training for FE teachers. Some of the RAC's were actively involved in compiling profiles of programmes and units available in their region to be of help to industry and students.

FEU Commentary

Analysis of needs

Programme development requires a forward looking analysis of present and likely future needs tempered with a retrospective analysis of experience. TEC's validation requirements encourage colleges to give particular emphasis to analysis of the needs of employers and thereby the needs of students as employees. Although the formal demands require colleges to identify prospective student numbers and the admission requirements, there is no advice to consider the needs of students as learners. The accent is on what students should learn rather than how they should learn. A consequence of this emphasis is a pre-occupation with the coverage of specific content at the possible expense of stressing transferability, probably the most crucial of technician skills.

In a systematic approach to curriculum development the analysis and design stages must relate proposed curriculum content to curriculum organisation. Whilst TEC requires colleges to develop a set of General Assessment Regulations (Circular TEC 12/75) there is no comparable requirement for colleges to take organisation arrangements into account before submitting the programme for validation. TEC regards decisions regarding the organisation and teaching of the programme to be the prerogative of the college, but care must be taken that curriculum implementation is not disjointed from curriculum design.

Consultation with industry

The extent and depth of consultation varied widely and so did the effectiveness. The most often quoted methods of consultation involved industrial participation in committee meetings of various kinds.

Development in the colleges

Development of the curriculum – analysis of needs

143. **Introduction.** Analysis of the context in which a new curriculum is being developed is rationally the first stage of curriculum development (paragraph 11). In the case of technician courses this might be expected to include an analysis of

a. the needs of industry and the employers of technicians, and the changes occurring in scientific and technological knowledge;
b. the needs of students and their aptitudes and ability;
c. the internal college structure and organisation and the resources available, the teachers, their skills and experience and need for further training and development;
d. the external support resources which might be available, eg teacher training or research organisations.

144. **The needs of industry.** TEC requires colleges to document evidence of their consultation with industry, and of the identified technician occupations with the associated knowledge and skills. The nature and extent of consultation undertaken by colleges and a measure of the teacher participation is illustrated in paragraph 152.

145. **The needs of students.** The needs of students as technician employees may be identified from the above consultations with employers. TEC is also concerned that the programmes should meet the personal needs of students (TEC Policy Statement 2.1.1. and 2.1.2.) and contribute towards improving the status of technicians in the community. The adoption of a unit programme structure, encouraged by TEC policy, can potentially cater for a greater range of student needs than the single course structure. Whilst a TEC validation form (VAL II: iv) requires the programme admission requirements to be specified, and so clarify the anticipated previous formal educational attainment of the students to which the programme must relate, there is no requirement for the identification of any needs the students might have as learners rather than technicians, eg appropriate study rates as opposed to study content. Colleges are not required to show how they might cater for students of wide ranging ability, neither are they required to describe any tutorial arrangements.

146. **The internal college structure and organisation and resources available.** TEC does not require the programme submission to show evidence of any analysis of how the programme will be organised within the existing college management structure or whether new arrangements will be necessary.

In cases where the new A5, B2 and C1 programmes are a direct replacement of the previous provision, colleges are not required to supply information about available resources in terms of staffing accommodation and equipment. (In other cases colleges are required to complete Val Form V – see TEC Circular 5/75.)

147. **External resources which might be available to support developments.** TEC, whilst aware of the demands of a new curriculum on colleges (TEC Policy Statement 3.3) does not ask colleges to provide evidence of whether any teacher development activities have been undertaken or planned, and colleges generally have made no responses on the matter.

Consultation with industry

148. The degree of success of college consultation with industry as seen through the experiences of college staff (and not employers) may be judged from evidence obtained from an analysis of programme submissions, visits to colleges by members of the evaluation team, and responses to questionnaire items.

FEU Commentary

Questionnaires and interviews with employers and past students can provide valuable data which ensures that the programme is designed with a focus on existing needs rather than past curriculum documents. Even in those cases where the comprehensiveness or validity of the data is limited, the findings can stimulate fresh thinking and forward looking perspectives which otherwise might be lost.

If programmes are adequately to reflect the needs of employers and their technicians, there is a major role to be fulfilled by college Heads of Department or appropriate teachers which requires change-agent skills. Where employers had not previously been contacted about the content of college technician programmes before the advent of TEC, it is likely that the contact would do little more than 'break the ice', especially in view of the comments made in the initial stages about the lack of knowledge of employers about TEC. A continuing relationship is needed to learn how programmes can meet requirements.

149. **The practice as documented by colleges in submissions to TEC.** Colleges are required by TEC to state (Val II: i) how they identified the group(s) of technicians for whom the programme is designed and how they obtained the necessary information. Most colleges (all in the case of C1 programmes), state that they have consulted employers. Relatively few colleges refer to calling upon their experiences of providing similar technician courses or information from other sources (eg Training Boards or Professional Institutes). A few colleges in the case of A5 programmes and about one-third of the colleges in the case of B2 and C1 programmes had obtained information from either present or past students.

150. The method of consultation most commonly used was meetings of formal committees, either newly established college or inter-college TEC committees or Departmental Advisory Committees. Visits to employers were made in the case of nine of the fourteen C1 programmes examined, and in nine of the twenty-three A5 programmes but only two of the ten B2 programmes. Questionnaires to employers had been used in the case of nearly half of the A5 programmes but to a much lesser extent in the case of C1 programmes and in only one of the B2 programmes. Employer involvement in the design of programmes was indicated in about half of the A5 and B2 submissions, but in only one in five of the C1 programmes.

151. One joint submission included seventeen additional pages comprising documentation used in arranging meetings, and lists of local employers, etc. Two joint submissions referred to a large scale survey undertaken on a country-wide basis and one B2 programme provided details of the results of a questionnaire completed by employers.

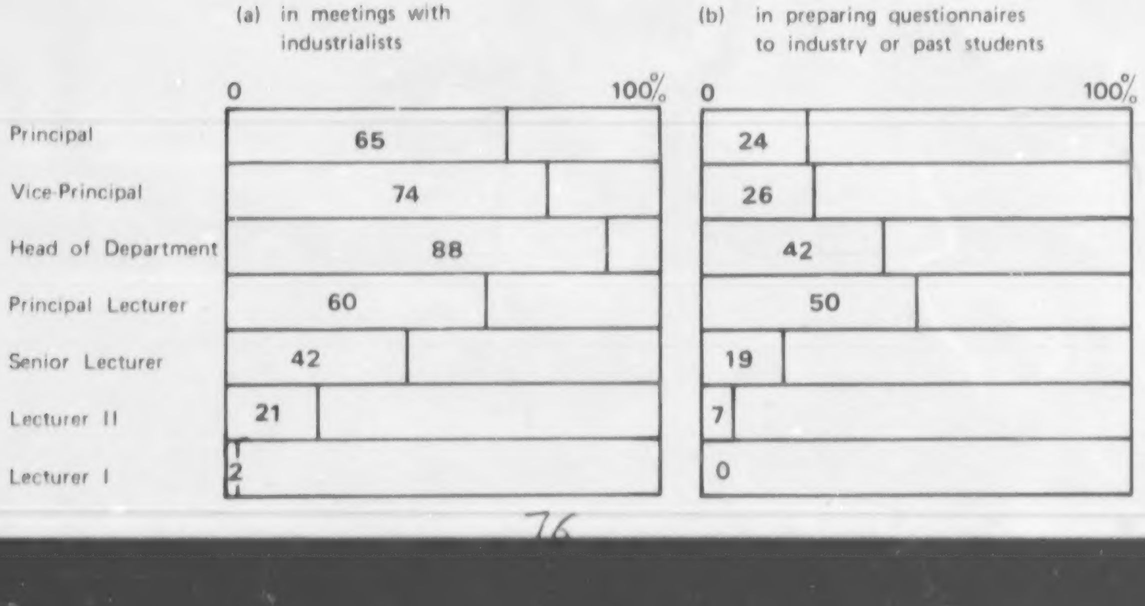
Involvement of teachers in consultation with industry

As might be expected the teachers involved in consultation with employers were those holding the more senior appointments.

Involvement in consultation with industry as identified by questionnaire respondents

152. About one in three teachers indicated that they took part in meetings with industrialists. Most of these teachers held appointments at the Senior Lecturer or more senior grades. The majority of teachers holding posts of Lecturer II and I were not involved (Table 22(a)). Similarly the more senior

Table 22 *Teachers taking part in consultation with industry (N=362)*
(as a % of each grade of appointment)



members of staff, but only a total of 13% of all respondents, indicated that they had 'undertaken the preparation of questionnaires to industry or past students' (Table 22(b)). Analysis by programme, suggests that fewer teachers of B2 programmes had been involved in meetings with industrialists or in visiting industry than teachers of the A5 and C1 programmes. This and data regarding involvement in the preparation of questionnaires, and in identifying technician functions are shown in Table 23.

***Table 23** Teachers taking part in consultation with industry (N=362) (by programme area, A5, B2, C1)*

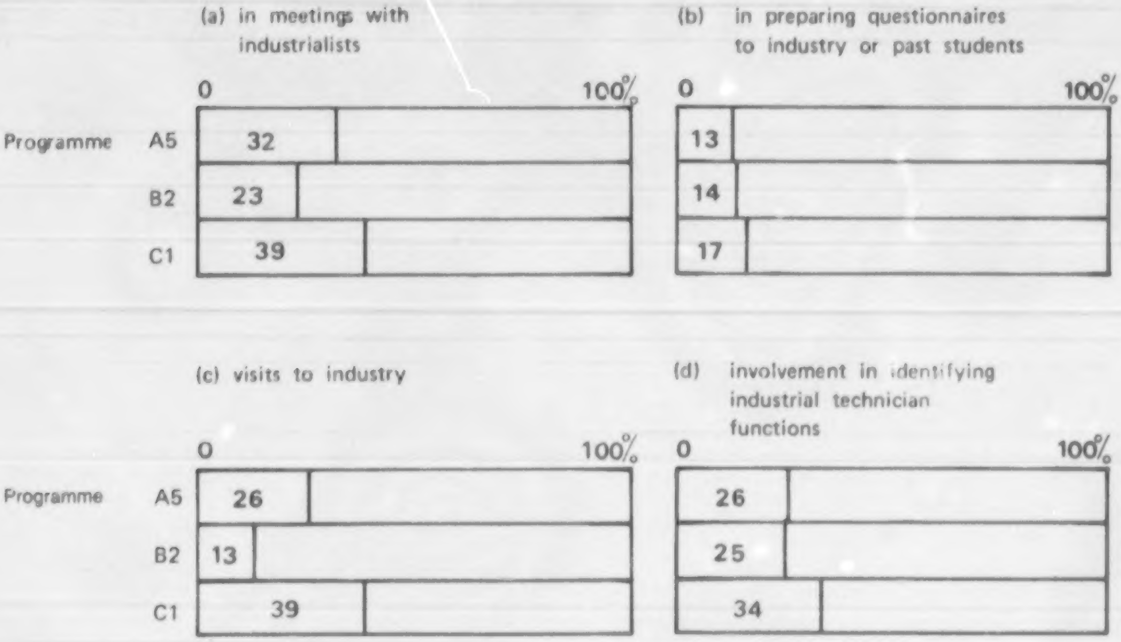


Illustration of college consultation with employers

153. Examples of reports by members of the evaluation team, of experience of consultation with industry are given below. They illustrate methods of consultation in the development of programmes. The first, the development of a B2 Certificate programme, exemplifies the employers' concern for maintenance of the standards associated with the previous courses and for the relevance of General and Communication Studies.

'Concurrent with the inter-college development an industrial conference was arranged in May 1975 to present the TEC philosophy and obtain useful feedback. The plea by industrialists was to maintain the existing ONC/HNC standards and a very strong plea for communications to receive a heavy weighting in any TEC scheme. Valuable contacts were established at this stage, the Head of Department making use of these people when its own submission was made in 1976. . . . With the general framework of the curriculum in expanded topic format teachers made many visits to local industry for face to face discussion. A structured question approach was used. The general reaction was one of bemusement – what the college thought as simple was thought to be complex by industry. No real major comments were received from industry, although useful comments were made on the combination of units. Following this time-consuming process the agreed curriculum was written in learning objective format and associated assessment models designed. . . . Should the opportunity have arisen to put the clock back and start again, an in depth study of technicians' job function in industry and much more discussion with practising engineers (would have been undertaken). . . . The teachers enjoyed the task (of industrial liaison). There was no major reluctance and they believed in the necessity of such a task' (Head of Department, College H).

FEU Commentary

Consultation with industry

The difficulties of consultation have been most acute for the college serving many small employers each releasing only one or two students each year to a specific programme. For collaboration between colleges and industry to result in a significant influence on the curriculum, a substantial commitment of time and resources by all parties is required.

Large employers with training and education personnel represent a different situation from the smaller firms. Where colleges could work with links established from previous course provision, they often reported that the need for a major change in the new structure was not understood by industry. Employers were however, particularly anxious that the standards which they associated with the existing courses did not decline in any new development.

FEU Commentary

In programmes at Certificate and Diploma level in Mechanical Engineering, Building Studies and Science, a high proportion of the programmes are devoted to basic knowledge and skills. The number of specialist units are relatively small. It is suggested therefore that in programme renewal, effective modes of consultation may take the form of inviting employers to comment on a college draft of the programme with a series of specific questions and opportunity for modifications to be made. As far as possible such consultation should take place through personal meeting and dialogue.

154. The concern for 'standards' and the effectiveness of General Studies provision is also apparent in this development of a C1 programme.

'About twenty-five employers of medical laboratory science technicians were selected, forming a high proportion of those who sent students on the relevant NC or CGLI courses, and were visited by the academic staff usually in pairs and sometimes including a representative of the local polytechnic in February-April 1976. About half of the staff of the Department took part in the exercise. By using on most occasions a form devised by a short-lived regional group, information was collected on number and types of technicians employed, their qualifications on recruitment, the work they did, and any topics that the employers believed should be included in the programme.

'According to the staff interviewed there were two aspects of TEC which most worried employers. One was the irrelevance as the employers saw it, to student or employer needs of the current (existing pre-TEC) General Studies provision. Most were not pleased by the formalisation of General Studies under TEC and suggested strongly that the content should emphasise obviously useful topics such as report writing, safety legislation and the structure of industry. The possibility of a decline in standards was the second main source of employer anxiety, for several believed that under TEC a student would be permitted an indefinite number of examination attempts and that nobody would be allowed to fail. Bringing ONC and CGLI students together on the same course in their view made the problem more acute. In consequence the role of the Science staff when visiting the firms was often one of education and pacification although many showed the same anxieties themselves!

'The scheme of visits undoubtedly made relations between the College and industry warmer, but seems to have had little effect on programme content. Topics suggested were either so broad that they would have been included anyway or so specific that they would have vocational relevance to just one or two students each year. None of the staff interviewed believed that the programme was of less value because of the lack of specialisation at certificate level, it was felt that what was needed was a "good educational grounding" ' (College N).

155. In some instances where substantial visiting by college staff to industry occurred, doubts were expressed about the value of the exercise.

'The process of consulting local industry was always accepted as an essential part of the development. Although variably interested in the changes in prospect as a result of the formation of TEC, there was little evidence that local employers were dissatisfied with the existing ONC course in Sciences. Nor, with one or two exceptions, did it appear that employers were anxious to modify the general draft programme to include specific material related to their particular interests. The consensus of opinion among the members of the C1/C2 programme design panel that in terms of the tangible outcome at least, the consultation hardly justified the time and considerable effort involved. The questionnaire completed by students and employers during the Spring and Summer of 1976 . . . revealed little that was new to the teaching staff concerned and, as a result, had little direct impact on the deliberations of the C1/C2 panel' (College J).

156. Colleges spoke of building on past good relations with industry. The following example illustrates how in the absence of other formal consultation, a senior lecturer took an initiative to seek student opinion.

'The departmental Advisory Committee had ceased to exist some years before the establishment of TEC. The attitudes of local employers were not unknown to the department. There had been regular visits over many years by the same staff and personal relationships were said to be good. Many of the managers and supervisors had been students in the department and were well acquainted with the Head and other long-serving staff. Some

members of the department were active in local branches of professional associations at which meetings often included an item on education and training. Visits of five or six major employers and the local polytechnic specifically to discuss the TEC programme were made by one or both of the two most active "lay" members of staff. Problems of the students' mathematical and scientific abilities were considered, and, at a later stage, opinions were sought on the structure of the combinations and the content of the two college-devised units. In the Engineering submission, as in the Science submission, few direct results of employer influence can be identified.

'Quite apart from the regular liaison or casual meetings, however, indirect employer influence was considerable. At an early stage of programme development, a senior member of staff (one of the two leading activists) distributed a questionnaire to students on the second year of the ONC course, Part II of the CGLI Mechanical Engineering Technicians Course and the first year of the polytechnic's HNC course, a total of eighty students altogether. It consisted of an extract from the Department of Employment classification of occupations and a request that the students should identify their present jobs and the jobs they expected to have a few years later. On analysis, the responses fell "luckily" into three roughly equal groups, and it was these groups which were used to identify the three programme combinations.

"a. Technicians concerned directly at shop-level in the implementation of production methods – providing practical and technical assistance to the production superintendent in methods, processes and equipment and in the operation of more sophisticated tools.
b. Technicians assisting mechanical engineers in the processes of design, development, specification, testing and analysis.
c. Technicians concerned with organisation of manufacture – planning, jig and tool, estimating, time and methods study, rate fixing, production control, workshop layout and tooling" (Submission document).

'Students in category a. – those engaged directly in the practical operations of production – were not expected to study beyond Certificate level, and Mathematics at Level III was not provided in the combination. To cater for that group, and to continue the existing departmental bias towards production engineering, the lecturer decided, with the Head's approval, that two college-devised units were needed, one in drawing and design for production and the other in control devices. Category b. students were seen as the most able academically and for them Mathematics III was made essential. In the combination for category c. students, Mathematics III was provided as an option.

'The final act of employer consultation took place in January 1977, the month before submission. Managers and training officers from forty companies attended one of two meetings at the college – "in a nice room, with sherry" – at which the Head of Department described some of the recent history of technician education and explained the nature of the new TEC scheme. The department's proposal was displayed, its use of standard units and model programmes emphasised, and it received, apparently, full approval'(College E).

157. Industrialists who were members of a County programme committee had expressed the view that there was no ready mechanism for them to consult their industry as a whole and so the committee relied on College Advisory Panels.

158. Colleges generally have not found easy the process of effective consultation with industry. This is particularly so in those cases where there are many small firms. Members of the evaluation team report, following their visits to colleges, that *'the industrial response to participation in course development had been very disappointing to most of the colleges. The clearly emerging pattern was that large employers have both the motivation and*

resources to nominate working party members while the small employers generally have neither' (Part 2B).

Many colleges recognise that there is a continuing need for explanation to industry about the new TEC programmes, but this is apparently prohibited by the large spectrum of tasks in which teachers are engaged. For the continuing academic and pastoral negotiations about the progress of students, liaison with industry appears to be good although colleges seem to rely largely on previously established contacts.

A fuller picture of the involvement of employers in the development of programmes is part of the current NFER evaluation.

Identification of technicians

With some exceptions, colleges appear to have found difficult the task of identifying specific technician functions, difficult, particularly in the case of science programmes. In some cases it is likely that consultation did not take place in sufficient depth; in others that specific skills were difficult to identify. It appears that the same basic job can be given many different titles. The science programmes in particular, reflect the concern by Professional Institutions amongst others, that the programmes should provide a basis for further study beyond the technician award.

The need for student technicians to develop communication skills is widely if not universally recognised. However having adopted the aims of the model programme provided by the respective Programme Committees many of the Mechanical Engineering A5 and Building Studies B2, submissions analysed did not reflect those aims concerned with safe working, safety legislation, environmental and social awareness in the section of the validation forms concerned with the identification of knowledge and skills.

Identification of technicians

159. TEC requires colleges to 'state the occupational category and/or the technician function for which each combination of units in the programme . . . has been designed', and also to summarise the knowledge and skills required by these technicians. (Val II: ii 2.1). In response to this requirement about half of the A5, one-third of the C1, and one in five of the B2 submissions examined, gave occupational category descriptions. Relatively few submissions listed technician jobs, this being greatest (about one in four) in the case of A5 programmes. Only one C1 submission listed technician jobs. Two-thirds of the A5 and C1, but only one-third of the B2 submissions, related the occupational categories on jobs to specific unit combinations in the programmes. The number of combinations of units varied widely up to as many as seventeen in one A5 submission but was typically three or four. Some submissions identify a need to produce general technicians and consequently do not include many options.

Knowledge and skills required by technicians

160. The detail given in the programme submissions varies widely. Most submissions emphasise:

i. the development of knowledge and understanding of subject matter,
ii. manipulative and practical skills,
iii. communication skills, both verbal and written.

The A5 programme submissions in particular emphasise higher cognitive problem solving skills and also management skills. It is particularly noticeable that whereas seven out of ten of the C1 submissions refer to safe working and safety legislation, only four out of ten do so in the case of A5 and two out of ten in the case of B2. Environmental and social awareness receives little mention.

Continuing consultation with industry

Colleges should develop systematic procedures for continuing consultation and programme review with employers in order to ensure curriculum development and relevance. These might include circulation to employers, at, say, two-yearly intervals a succinct report of the relevant TEC programmes, both to firms whose employees are students of the programmes and to others. Such a report might include details of the programme content and availability, and overall student success.

Proposals for continuing consultation with industry

161. Colleges are required to describe the arrangements with industry for feedback of information about the continued suitability and relevance of the programme(s) of study (Val II: i 1.2). Most A5 and C1 submissions reviewed, proposed using formal feedback mechanisms involving committee procedures, just over one half doing so in the case of B2. Colleges referred to the role of Departmental Advisory Committees, to college TEC Committees and in a few cases to Inter-College TEC Committees.

About one-half of the A5 and C1 submissions mentioned the use of informally arranged visits, meetings and personal contacts with college staff. Several colleges referred to obtaining feedback through discussion, with employers, of college reports of the progress of individual students. Many C1 and A5 submissions stressed the use of long established links with industry, but there was little evidence of newly designed systems for ensuring the continuing involvement of employers in curriculum renewal.

FEU Commentary

Regular visiting to employers and face-to-face contact must be maintained and further developed. Groups at study conferences on the Evaluation of TEC Programmes identified the careful preparation needed if visits to individual employers are to be fruitful (Coombe Lodge Report, 1979).

Completing validation forms

Whether a college receives approval to operate a TEC programme depends largely on whether it has completed validation forms in a manner which is satisfactory to a TEC programme validation committee. Thus a college endeavours to give attention to its perception of the demands of the validation forms. In a situation in which little, if any, additional resource is provided for curriculum development if there are any curriculum elements for which information is not requested then these will receive little or no attention at the design stage. Colleges can be expected to attempt to identify and follow the 'rules of the game', making judgements as to what information to give in terms of a measure of political expediency.

The validation forms, then, exercise a considerable measure of influence and control over what is considered at the design stage. The TEC forms have caused colleges to articulate the structure of the programme in terms of the needs of students as technicians, combinations of units, objectives and the approach to assessment, but not to identify or give examples of proposed teaching and learning activities. If the validation forms required colleges to give evidence of a consideration of the students' needs as learners (eg group and tutorial learning provision and study rate according to ability range), then it is likely that colleges would do so.

Programme aims

Many programmes adopt a list of aims without any accompanying rationale or discussion. In such cases the validating committee have no evidence of the extent to which

Development of the curriculum – design features

162. **Introduction.** Curriculum design requires definition of aims, of content in terms of objectives, and knowledge and skills to be learnt, teaching and learning methods and experiences and their organisation, and assessment procedures and methods. The design stage should also consider how the programme will become operational, and accommodated in the existing college structure. Any changes which might be required should be identified.

163. TEC require the following aspects of the decisions made in the design stage to be documented for validation:

Aims of the Programme (Val II: iii)

Admission and Credit requirements (Val II: iv)

Assessment Approaches (Val II: v)

A summary of the content of the Programme (Val III)

– a validation form which 'combines the functions of a summary for the Programme Committee, a computer input document for processing and a statement of what is approved'. In the case of unit programmes, the value and Level (Val III: U ii), and the separate combinations of units with the same award title (Val III: U iii) are given. A further form (Val III: iv) is designed to assist Programme Committees in their consideration of common Standard units.

164. **College devised units.** The format of the Standard units issued by TEC illustrates the information expected which includes Aims, Unit Content, expressed as General and Specific (Learning) Objectives, and an Assessment Analysis. Although teachers are instructed to 'design the learning process to meet the general objectives' and that for example, 'practical work could be the most appropriate teaching method for the achievement of the objectives', there is no requirement for programme designers to give any information about the selection and organisation of teaching and learning methods, or about the structuring of the subject matter in the programme.

Aims of the programme (Val II: iii)

165. All the A5 and C1 programme submissions in the sample analysed, and almost all of the B2 submissions, adopted the practice of referring to the aims of the model programmes in the Guidelines issued by the respective Programme Committees as instructed in the Validation Form. Additional statements were only given by less than half of the A5 programmes and less

FEU Commentary

these have been discussed or may have influenced the teachers of the college or the programme. If accompanying argument were required this might be of help and also avoid the possibility of a college adopting a list of aims from an external source without their implications being fully explored. Of course whether aims are adopted from an external source or devised *ab initio* by a college development group, teachers, students or employers may not be aware of them.

Admission requirements

Whilst the requirements of validation forms are generally clear, some modification to the validation form Val II: iv might be helpful, since different colleges present information about credit arrangements in different sections. It could be argued that all college admission arrangements are 'normal' in that an overall package is required to deal with the typical spectrum of applicants.

Assessment information

The requirement for detailed proposals on the approach to assessment reflects TEC's concern for the maintenance of standards of its awards. Generally colleges responses indicated that a good deal

than one-third of the B2 and C1 programmes. Just three of the twenty-three A5 programmes included additional aims for General and Communication Studies.

Admission requirements

166. The TEC validation form (Val II: iv) requests information about the programme admission requirements required by the college, under three headings:

'4.1 Normal admission requirements for the programme'

'4.2 Admission/credit arrangements for craft and other post-experience students'

'4.3 College procedures for deciding on unusual cases of admission qualifications and credit'.

Analysis of the information the colleges presented was difficult since responses, which overall were similar, were distributed differently between the sections 4.1 and 4.2. For example some gave credit arrangements in section 4.1, whilst others confined these to 4.2.

Minimum entry requirements

167. Most of the B2 submissions had adopted the requirements given in the model programme guidelines. This was also the case for about half of the A5 and C1 submissions. About one-third of the submissions stated that any other qualifications deemed equivalent would be accepted. One of the colleges in the sample offered only a two-year Certificate, C1 programme with minimum entry requirements raised to GCE 'O' level Grade C or CSE 1, in appropriate subjects. Two submissions referred to the use of standard tests to assess basic skills.

Credit arrangements

168. Differing programmes mentioned alternative qualifications or attainment for which credit would be given. For example, over 70% of B2 and C1 programmes indicated credit would be given for GCE 'O' or CSE 3 and 65% of A5 programmes indicated credit for Craft Course passes. Relatively few colleges cited the intention to give credit on the basis of performance in college tests on entry. A few colleges only proposed to give credit subject to accompanying remedial work in difficult areas. About one in four of the A5, over half the B2 and about one in four C1 programmes identified the intention to allow credit to give entry to a two year programme. When decisions about credit arrangements were required, about 40% of the submissions indicated involvement of the (appropriate college) TEC committee. Fewer referred to the decision being taken by a member of the teaching staff.

Procedures for unusual cases of admission, qualification and credit

169. Colleges gave only brief responses. The most common procedure proposed for dealing with unusual cases of admission involves decisions by the college or department TEC programme committee. About one in five programme submissions indicated consultation with employers and/or the external moderator. A5 programmes in particular and to a lesser extent B2 programmes proposed to use college entrance tests. About one in three programmes indicated the student's previous experience would be considered. About one-third of the programmes indicated that the student's performance on interview would be taken into account.

Assessment information – overall approach

170. TEC validation form (Val IVA) asks colleges to 'include any general statement they may wish to make on the overall approach to assessment' and to state their policy on 'progression of students who are not successful in a

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of consideration had been given by those teachers involved. However few presented an assessment philosophy for the programme as a whole. The extent to which colleges were explicit about the role of committees or the external moderator, in decision making about student achievement and awards, varied. This is to be expected since in a newly developing system many colleges were uncertain about these roles, although TEC Circular on the 'Role of the External Moderator' was available from the latter part of 1975.

The variety of practices proposed in colleges' programme submissions (paragraph 106) is a consequence of TEC's encouragement that they should select their own assessment procedures, rather than adopt a uniform pattern. In general the proposals are indicative of colleges' interpretation that fairly formalised procedures were required. For example little reference is made to the use of oral assessment, an area in which staff generally lack experience.

In the introduction of the framework for assessment TEC or its officers did not anticipate the operational difficulties which were to arise on implementation of the college-devised assessment plans. It would have been appropriate for TEC, particularly in view of its concern for *national* standards, to exemplify 'normal' practice which might be adopted. Colleges could have then been given opportunity to propose alternative practices in the light of experience and/or in consultation with the moderator. More guidance from TEC, would have been helpful to many colleges. With no pilot schemes TEC was unable to provide this.

Completing validation forms

The purpose of providing curriculum specifications is presumably an attempt to ensure appropriate teaching and learning practice which leads to technician awards of the required standards to meet perceived needs. In this context the strengths and limitations of the TEC programme validation procedures must be recognised. Essentially, validation of TEC programmes is a

unit or subject'. Typically statements of the overall approach refer to the use of phase tests, end tests and course work. The role of a college TEC committee is referred to by about 40% of the submissions in the sample and a similar proportion indicate the involvement of the external moderator (correspondingly 60% not making such reference).

Action if a student fails an in-course assessment

171. Many colleges give comprehensive accounts of their procedures for various types of failures, eg in-course, end-of-unit test, overall assessment fail; marginal, bad or persistent failure. However, in the case of many of the B2 submissions little detail is given. The actions to be taken in the event of each type of failure include: repeating the unit, remedial work, resitting the assessment, proceeding to the next level where success gives credit in the pre-requisite, and consideration of extenuating circumstances. Relatively little use of interview or oral examination is proposed.

About 60% of the submissions identified that decisions on the course of action would be taken by the college TEC committees.

172. TEC also ask colleges to state the circumstances in which students may be recommended for an award although not successful in a final stage unit (Val IVA: i 4b). About half the programme submissions indicated that an award would depend on the overall performance of the student being satisfactory; less than 50% envisaged consultation with the moderator, and more than two-thirds the decision being made by the college TEC committee. Less than one in five colleges mentioned success in retaken assignments. Two submissions stated a requirement for students who failed badly to repeat the relevant unit. One college gave information on a precise level of failure at which a recommendation for the award would be made.

The degree of detail presented in programme submissions (made prior to 1978)

173. An analysis of the extent of information provided by colleges in each section of the validation document showed the following features about the sample of programme submissions:

a. in general, Building Studies B2 submissions were less fully documented than Science C1, and Mechanical Engineering A5 submissions. To a large extent this is due to the fact that in this sample B2 submissions had used the first issues of TEC validation forms before their revision for submissions during the 1976-77 session;

paper and postal exercise, involving intrinsic analysis of curriculum proposals (the curriculum 'in design') rather than the validation of the curriculum in action. Whilst an experienced group of teachers and others meeting to validate a programme as documented can examine its internal coherence, it can only act on the basis of the information in the submission. (It must be remembered that the quantity of documentation is not always an indicator of the quality.)

The present TEC validation forms do not require colleges to indicate whether the process of programme development has involved just one or two members of the staff of a college or a large team of contributors. The degree of involvement or commitment of teachers may be impossible to ascertain, unless further details are requested from the college and discussion or visits take place. Assuming that involvement of teachers in curriculum change at the analysis and design stages is more likely to lead to desired practice and the achievement of intended outcomes it would be of benefit to the curriculum if programme submissions include evidence of the collaborative work undertaken in development.

Clearly the amount of information which can be presented and validated is limited, but since the formal demands are likely to have considerable influence on action and outcomes in the colleges it is important that the information sought is reviewed. Two further areas of evidence from colleges which may result in beneficial outcomes are suggested. Firstly, commentary which shows more explicitly that the overall selection of units and provision of teaching and learning experiences are likely to secure the achievement of programme aims. Secondly, details of the training and personal development experience of teachers of the programme during the last five years and future plans. Request for such information is likely to cause colleges to give more deliberate attention to the importance of appropriate staff training, development and resources necessary.

b. A5 submissions document consultation with industry, and the identification of technicians and the knowledge and skills they require, more fully than C1 and B2 submissions;

c. the least documented part of the submissions was the circumstances in which students might be recommended for an award although not successful in a final stage unit (Val IVA: i 4b).

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Membership of programme development groups

The involvement of teachers in the process of curriculum development is likely to lead to their better understanding of the intentions expected from the curriculum in action. It is pertinent to note therefore that about half of the teachers have not had the benefit of learning together in development groups.

It is important that decisions of the tasks to be undertaken between meetings of development groups are clearly recorded and communicated to those whose responsibility it is to undertake them. The detailed recording of minutes however should be of low priority since curriculum development is an evolutionary process and the latest agreed draft of the curriculum statement should be regarded as the working document.

The teachers in the sample in this enquiry who participated least in development groups were teachers of Workshop Processes. This reflects not only the evidence that teachers in these groups are more likely to hold more junior levels of appointment, but also the lower esteem in which this area is held relative to the technological, scientific and mathematical disciplines, and their limited involvement in previous technician courses. Those responsible for managing curriculum development groups have a particular responsibility to ensure all relevant areas of expertise are adequately represented or called upon in development work in order to avoid, in so far as possible, an imbalance at the curriculum design stage.

Qualifications and experience of teachers involved in development groups

Teachers with greater full-time FE experience were more likely to be members of development groups, in accordance with their greater seniority. The evidence is consistent with the suggestion that participation in development is unrelated to the

Participation of teachers in programme development

Membership of programme development groups

174. About half of the teachers indicated that they had not been 'a member of a group or committee set up to develop the Certificate or Diploma Programme'. Just over one-third of those involved were members of a group in their own college and almost a quarter were members of inter-college groups. The questionnaire responses indicated that whereas the proceedings of inter-college meetings were more often minuted than not (ratio minuted to non-minuted approximately 2:1) the reverse situation holds for intra-college meetings (ratio approximately 1:2).

175. An analysis of the extent to which teachers of different subject areas were members of development groups or committees shows most disciplines to be similarly represented with some notable exceptions (Table 24).

***Table 24** Membership of development groups or committees*
(Percentage of teachers involved categorised by subject area)

Inter-college groups	
Measurement, Site surveying and levelling [N=18]	50
Chemistry/Biology [N=20]	47
Construction Technology [N=20]	40
Mathematics [N=60]	28
Engineering Drawing [N=44]	23
Physical/Engineering Science Physics [N=91]	22
General and Communication Studies [N=45]	20
Manufacturing Technology [N=49]	20
Workshop Processes [N=33]	12

Intra-college groups	
Chemistry/Biology	66
Measurement, Site surveying and levelling	54
General and Communication Studies	39
Manufacturing Technology	39
Physical/Engineering Science Physics	38
Mathematics	37
Construction Technology	35
Engineering Drawing	34
Workshop Processes	24

176. Teachers of Workshop Processes were the least represented in both the inter- and intra-college groups. This may be attributable in part to a high proportion of these teachers holding Lecturer II (33%) or Lecturer I (52%) appointments.

177. Since 46% of the teachers of the A5 programme who responded to the questionnaire indicated that the Certificate programme was carried out in collaboration with other colleges and either as a joint submission (33%) or with independent submission (46%) it is surprising there was not a larger proportion of Manufacturing Technology teachers in the inter-college groups (33% of this sample of teachers held post of Principal or Senior Lecturer).

Qualifications and experience of teachers involved in development groups or committees

178. Whether a teacher is a member of a development committee or group appears in general not to be dependent upon the possession of a Certificate or Diploma of Education, since the proportion of those holding such awards who were members was almost identical to that for non members.

179. A greater percentage (68%) of the teachers with 6-10 years of industrial experience were members than those with either less, or over 10 years' experience (about 50%). Membership of development groups and

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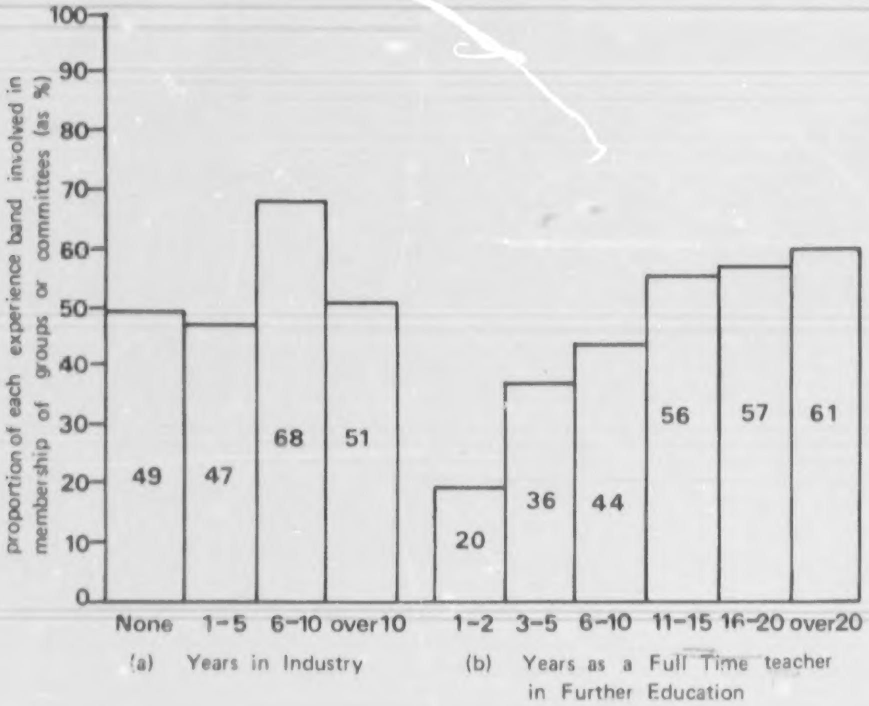
extent of a teacher's formal teacher training experience or industrial experience.

committees is related to the years of full-time teaching experience in Further Education, eg whereas about 60% of those with more than 10 years of experience were members of such groups, less than a third of those with one to five years' experience were members. The proportion of each experience band involved in membership of groups or committees is shown in Table 25.

Table 25 *Involvement of teachers in groups or committees set up to develop the certificate programme: experience in industry and FE teaching*



Participation in decision making

Heads of Department generally have been the members of staff most involved in the decisions about the various aspects of programme development. The relatively minimal involvement of teachers with the post of Lecturer I reflects their principal role as course implementers. They continued to undertake the major teaching functions demanded by the existing courses soon to be replaced.

The awareness of the majority of staff of a college at the early stages of development appears to depend largely upon the management style of the Head of Department.

The relative effectiveness of informal and formal (committee) decision making structures is difficult to distinguish without intensive case studies of individual colleges (Gleeson and Mardle, 1980).

Participation in decision making in college programme development

180. About half of the teachers of TEC programmes indicated they had *not* participated in the various decisions which were made in the design of the new curriculum and about the needs of industry and students.

The relative extent of involvement of teachers at different levels of appointment in decisions about a range of issues is shown in Table 26. An index of a measure of this involvement has been calculated in which a value of 10 would represent a very high degree of involvement by all staff in the category, and 0 would represent minimal or no involvement. Clearly those most heavily involved in decision making were the Heads of Departments although their involvement in decisions about 'appropriate objectives of units', about 'appropriate teaching methods' and General and Communication Studies was less than in other areas. Particularly evident is the minimal involvement in *all* the decision areas, of the Lecturer Is who make up in this sample almost one-third (29%) of the 'classroom teachers' of TEC programmes. Overall, least participation took place 'in decisions made about General and Communication Studies units'. However whereas, for example, few teachers of Physical and Engineering Science and Physics (9%) were involved in this area, more teachers of General and Communication Studies had been 'very involved' (29%) or 'quite involved' (13%).

181. One programme co-ordinator explained that the authority of the Head of Department and himself was *'effectively sanctioned by all the staff . . . (we) are encouraged to make decisions on their behalf – an awful lot of casual discussion and consultation did take place'.*

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However it is clear that negotiation across departmental boundaries is often delicate and sensitive and provides barriers to easy development. In particular there continues to be a need for increased collaboration between teachers of General and Communication Studies and technical disciplines.

Influence in determining the time scale of college programme development

Teachers' responses again indicated the major influence of the Heads of Department on determining the schedule for programme development. Rivalry between departments of different colleges and within colleges at Head of Department level is strong.

Two factors which appear to have been major determinants in the rate of introduction of programmes are firstly, the publication by TEC of a timetable of dates from which programmes would be first validated, and secondly the curtailment of the activities of the existing Joint-Committees by the DES. Once a college sensed that developments might be underway in neighbouring colleges, then the motivation not to be left behind was high. When col-

Table 26 *An index* of 'the extent of participation of teachers in the decisions which were made about aspects of the programme before it was submitted to TEC for validation'. Responses categorised by level of appointment.*

	P	VP	HOD	PL	SL	LII	LI
Entry requirements	6	4	8	8	3	2	1
Needs of industry	5	5	8	6	3	2	2
Needs of students	4	5	8	6	4	3	0
Which units should be available	4	4	8	6	4	2	1
Whether standard units should be adopted	3	3	9	6	5	3	2
Appropriate objectives of units	2	3	5	4	5	3	1
Appropriate teaching methods	2	3	5	3	4	3	1
Assessment methods to be used	3	4	8	6	5	4	1
The programme assessment plan	2	3	7	6	4	2	1
Units of General and Communication Studies	4	3	5	3	2	1	0

$$^{*}\text{index} = \frac{3\left\{\begin{array}{c}\text{\% responding}\\ \text{'very involved'}\end{array}\right\} + 2\left\{\begin{array}{c}\text{\% responding}\\ \text{'quite involved'}\end{array}\right\} + 1\left\{\begin{array}{c}\text{\% involved to}\\ \text{'a small extent'}\end{array}\right\}}{30}$$

An index of 10 would correspond to all teachers being very involved.
An index of 0 corresponds to no involvement or almost no involvement of all teachers.

Influence in determining the time scale of college programme development before submission

182. The members of college staff who were, by far, the most influential in determining the date by which programmes had to be sent to TEC for validation seemed to be Heads of Department (Table 27). About half of the respondents expressed this view, compared with only 17% who identified Principal or Senior Lecturers (46%). 'TEC and/or its officers' were identified by 12% of respondents as more influential in determining the time scale than the college Principal or Vice Principal. (About one quarter of respondents were unable to judge.) Responses were not significantly dependent upon the programme area (C1, B2, A5).

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leges believe that some of their students could on geographical grounds choose the institution which they attend the pressure upon them to move with the new, if uncertain, currency is strong. Nevertheless some colleges in early discussion recognised that a September 1976 start for A5 and B2 programmes would be unrealistic and gave themselves about a year to prepare for a September 1977 start.

Some colleges held back because they 'learnt informally of courses being rejected in the validation process' and decided to learn from others.

Table 27 *Persons most influential in determining the date by which the programme had to be sent to TEC for validation – as perceived by questionnaire respondents [N=362]*

Heads of Department	46%
Principal or Senior Lecturers	17%
TEC and/or its officers	12%
Lecturer IIs	6%
Principals	6%
Vice Principals	5%
Others (external to respondents' college)	3%
Unable to judge	24%

(NB Respondents were invited to make one or two responses, therefore the total exceeds 100%)

Involvement in the design and preparation of programmes

183. **Teacher opinion as to who undertook most of the work.** Teachers were asked to state who in their opinion undertook most of the work involved in designing and preparing the programme for submission to TEC. Since they were given the opportunity to make up to three responses, it is considered that a qualitative rather than quantitative interpretation is more justified. Table 28 shows the rank order of responses by staff at each level of appointment. Taking all responses into account there is no doubt however that the overall position is one in which the teachers' views are that the Heads of Department, Principal/Senior Lecturers and Lecturer IIs are the most involved, the Principals and Vice Principals on the one hand, and the Lecturer Is on the other, being very much less involved.

184. The extent to which a teacher believes his colleagues have undertaken most of the work involved, depends upon his level of appointment (and, therefore, role in the college). This can be illustrated by looking at the beliefs of the various 'grades' of teachers about the involvement of Heads of Department. Whereas the Principals/Vice Principals (about 70%) believe the Heads of Department have undertaken most of the work involved in designing and preparing the programme for submission to TEC, which is in accordance with most of the Heads' own views, the Lecturer Is believe that teachers at all lower levels of appointment, including themselves, have done most of the work (Table 28).

Table 28 *Teacher involvement in designing and preparing programmes for submission to TEC. Order of decreasing involvement as judged by teachers categorised by level of appointment*

Category of teachers expressing opinion	Order of decreasing involvement	
	Maximum	Minimum
1. P/VP, Principal/Vice Principal [N=40]	HOD>PL/SL>LII>>	P/VP~LI
2. HOD, Head of Department [N=33]	HOD>PL/SL>LII>>	LI~P/VP
3. PL/SL, Principal/Senior Lecturer [N=65]	PL/SL>HOD~LII>>	LI~P/VP
4. LII, Lecturer II [N=110]	PL/SL~LII>HOD>	LI>P/VP
5. LI, Lecturer I [N=90]	PL/SL>LII>HOD>	LI>P/VP
6. All posts [N=362]	PL/SL>LII~HOD>>	LI>P/VP
All posts as % of all respondents*	54 39 40	12 7

*Note: a. up to 3 responses were invited;
b. other categories of response included, 'do not know', 7%; 'others not on college staff', 7%; no response, 3%.

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Teacher involvement in programme design

Most involved in the work of programme development have been the Heads of Department. Generally those least involved have been the more senior staff, the Principals and Vice-Principals, and the more junior staff, the Lecturer Is. Whether Principals or Vice-Principals are involved in detailed development work is likely to depend upon their academic discipline and experience. Where this does not coincide with areas under development they are unlikely to set time aside from general college management.

The relatively small involvement of the Lecturer Is can be attributed to their greater time allocation to teaching the courses which TEC has replaced. Generally these are the teachers with the least experience of curriculum design. Many of them rightly regard the tasks of curriculum development to be the role of the more senior (and more highly paid) staff. However involvement of teachers in programme development is likely to be beneficial in terms of their personal development and commitment.

In general terms the hierarchical departmental structure, which typically is characteristic of the organisation of colleges, strongly influences both the degree of involvement of teachers in programme design and their working relationship (see Tipton, 1973). In many of the case studies of programme development, change strategies appear to be predominantly 'power-coercive' in nature.

185. Evidence from case study work. In all the cases of programme development examined through case study work the Head of Department, with which the programme was most closely and readily identified, played a key part. In most cases the more senior staff, Principal and Vice Principal(s) took a relatively passive role. Those cases in which they took a significant lead in the curriculum development coincide with their own professional area of interest and experience. Thus the Principal and Vice Principal of a small college developing a B2 programme appear to have undertaken most of the analysis and design exercise with little involvement of their staff. This was the first TEC programme to be developed in the college and it is interesting to note their relatively small involvement in two subsequent B3 and B4 programmes. In the case study colleges the Principals and Vice Principals actively involved in inter-college development work were those who could provide experience of curriculum development in the relevant areas of technical education. The non-involvement of the more senior staff in the curriculum development can be attributed to a large extent, not surprisingly, to their management role of a large college covering many fields of work, and frequently to their own academic or practical skills being in other disciplines.

Involvement in specific tasks of programme design

186. Compatible with teachers' opinions, indicated above, are their responses regarding their own part in tasks involved in programme planning and development which again show the predominant involvement of Heads of Department, Principal and Senior Lecturers and in some tasks the Lecturer IIs (Table 29). A high percentage of Heads of Department, Principal and Senior Lecturers and Lecturer IIs 'undertook the writing of objectives (and), devising the assessment analysis for one or more units'. Fewer Lecturer IIs and Senior Lecturers took part in the more administrative tasks of completing the assessment plan, and in particular of completing the TEC Validation Forms. Very few Lecturer Is were involved in any of these tasks.

***Table 29** Teacher involvement in programme design (as % respondents, categorised by level of appointment, replying 'yes')*

Task	P	VP	HoD	PL	SL	LII	LI
Writing of objectives	6	22	52	60	63	51	14
Devising the assessment analysis	6	26	64	60	65	48	17
Completing the assessment plan Val IV: A	0	26	70	60	43	33	7
Completing the TEC validation forms	12	35	73	50	26	16	6

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Development of joint submissions

Generally colleges' experience suggests that the development of joint schemes with other colleges represented a useful and viable way of getting the new TEC programmes launched. Inter-college collaboration enabled the developmental workload and costs to be shared, and the college staff involved to gain mutual support through the sharing of experience, expertise, and ideas. There were and there remain associated organisational difficulties; for example the time required to travel and attend meetings, and the mechanisms of agreeing desired programme amendments. A joint development is almost certain to mean that fewer teachers of any one college participate in the design stage, with a potential loss of commitment of those who might otherwise be involved in a single college development. Teacher involvement in curriculum problem solving will develop their understanding of the intentions of new developments, and assist them in overcoming uncertainty.

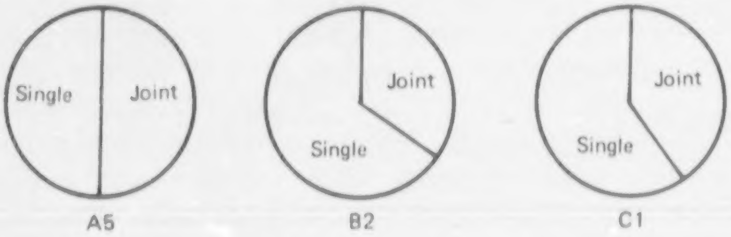
Eric Hewton (1980) has argued recently that co-operation and collaboration are appealing concepts to which we all pay lip service but towards which, when we are faced with real commitment we feel some uncertainty, even resistance. He categorises inhibiting factors under four headings: 1. the *autonomy* which colleges and teachers seek to preserve, 2. the *time* required, 3. *social-psychological* factors, eg the need to trust, to compromise, to support, 4. the *complexity* which results from co-operation.

Illustrations of these 'costs' of collaboration which must be set against the benefits are to be found in TEC developments. Colleges do value their autonomy, and rivalry and jealousy must be recognised. Time pressures have resulted in less collaboration than desired. Teachers have indicated the difficulties arising

Inter-college joint programme submission

187. TEC believed 'that in many cases the design of joint proposals by colleges acting in collaboration' would be the best approach and will represent the most economic use of colleges' resources. The Council suggested that LEAs might 'explore with their colleges the possibility of collaborative schemes, where appropriate'. [TEC Policy Statement, 5.4.]

A substantial number of collaborative schemes have been developed, many of these resulting in the joint submission for validation of a programme common to a number of colleges. The figure shows the proportion of joint to single submissions for A5, B2 and C1 programmes, expressed in terms of the number of colleges involved. (Data as at March 1980.)



Complementary evidence has been obtained about the potential advantages and disadvantages of joint-submissions as opposed to single college submissions from visits of members of the evaluation team to colleges and from teachers who responded to open-ended questions.

Inter-college collaboration resulting in joint-submission and validation

188. The collaborative developments which were sustained to a joint submission and validation were generally characterised, in the case of the sample of colleges examined, by the involvement as a matter of policy of one or more LEA officers from an early stage of the development. Extracts from three reports of the development of different programmes, with substantial LEA officer commitment to college collaboration are given below.

189. *'From the outset it was policy to develop each TEC programme as a collaborative effort between all the colleges although the concept of a joint-submission developed later.*

'A Structure of Sector and Programme Committees paralleling the TEC central structure was established. The A5 Programme Committee had one representative from each college, two General and Communication Studies representatives and two industrialists. The college representatives clearly reported back to colleagues and to their Heads but subsequent experience has shown that one of the weaknesses of a joint submission procedure is that not as many staff in the individual colleges get involved as in a single college submission. Commitment to the submitted scheme is therefore variable . . .' (Chairman County Programme Committee, P).

190. A second example is taken from the development of a B2 programme.

'An LEA adviser called a meeting of selected representatives from all the colleges which were operating building subjects within the County in March 1976. [He] informed the meeting of the imminent changes taking place within the County with regard to technician education . . . informal discussion took place when the following suggestions were made: a. Standard units to be adopted where appropriate with some units specific to local industrial requirements added, b. a collaborative scheme to be submitted on behalf of the County as a whole'. A formal 'TEC Section B Development Committee' was established 'a. to determine a pattern for TEC programmes within the County the pattern to be ratified by the Panel of College Principals, b. to ensure that programmes as appropriate are ready for submission to TEC by June 1976'.

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in making compromises and the doubts then arising that needs are not being met. Colleges participating in joint schemes have experienced the administrative complexity if changes in agreed programmes specifications are required.

Collaboration seems particularly appropriate and advantageous in the case of smaller departments or groups with relatively small student enrolments or staff resources to devote to development, and where geographical distances separating colleges are relatively short. In the case of large departments and heavily subscribed programmes the cost of collaboration identified above may outweigh the advantages. Joint development may bring beneficial contact between institutions but reduce the possibilities of staff collaboration within a college.

'A sub-committee of representatives from each college was formed with the brief "to establish a method of investigating the requirements of the local industry for TEC." In due course staff of each college visited industry to explain the reason for industry and the technician . . . and to write comments from employers. . . . Local industrialists were invited to attend one of two conferences . . . chaired by the County Adviser. Among the factors assisting the development were the County Adviser's eagerness to get TEC successfully off the ground, the short time scale between the inaugural meeting and the submission date given to us, the assistance and expertise of certain committee members who had attended certain DES conferences, etc and who had acquainted themselves with TEC philosophy . . . factors which hindered development included the necessity to call numerous meetings, the difficulty of appointing days and times to suit all or even most of the committee; the need to provide "class cover" for lecturers attending meetings; the resistance to change, influenced by industry and a number of lecturers who were opposed to changing the system fearing an increased work load, the underlying jealousy and rivalry between colleges' (Programme Co-ordinator, College G).

191. In the third example, collaboration in the development of a science programme occurred where previously there was no tradition of formal co-operation. The successful joint-submission can, in part, be attributed to the non-competitive distinctive form of the collaborating colleges and the building on existing relationships between some of the staff of the respective colleges.

'There was very little competition among the colleges. One college withdrew, another had a secure future as a tertiary college and the other two were separated by the breadth of the County. This initial separation of interests was strengthened by the responsibility given to each of the three colleges for developing the course which it already had (respectively combinations for Physics and Chemistry Technicians, Medical Laboratory Science, and the School Laboratory Combination). The result of this separation of interests was that [in general] there was very little formal conflict among the participating colleges.

'The involvement of LEA committees and senior officers gave high status to the consortium and would have made anything other than participation a difficult strategy for a college to adopt.

'The work of the [Science] Panel may have been helped by the relationships which already existed between its members. Several key participants had worked in more than one of the colleges involved.

'However, since the Programmes were submitted and approved the Panel has not met. Reasons for this inactivity may be due to the different emphases of the contributing programmes and to the different stages in implementation which each college has reached. One delaying a start until 1979, another recruiting only Level I students in 1978' (College J).

192. The following extract from a report of a case study at a college participating in a joint submission, illustrates both the potential advantages and problems as seen by teachers of the college.

' "The relations among members on the County committees were generally good and there was a feeling that the committees helped reduce the 'isolation' of individual colleges and lecturers in the approach to the development of TEC programmes. This was seen as a plus factor, as was the fact that committees afforded members an opportunity to discuss pedagogical and other problems with colleagues who for the most part were subject to the same pressures. The exchange of ideas was seen as a valuable part of committee work." Not unnaturally these expressions of satisfaction with the County committee approach were for the most part restricted to those members of staff who had participated in the development process. The majority of lecturers not so involved tended to express misgivings with the county operated scheme and the County committee system of curriculum

development. . . . Principal among the criticisms was the feeling that political, rather than academic considerations frequently guided committees in their deliberations. The conflict of interests among participating colleges was seen to have had a major influence upon the structure and content of committees. Again it was argued, because the programme committees set up by County were separate and essentially autonomous, each committee brought different ideas to bear upon the development of programmes with little, if any, attempt to view the requirements of the student and of industry in the round. Hence in the case of mathematics, content for the same level was differently constructed by each committee, with consequently no commonality apparent. Because of what most lecturers agreed was a need to rush the submission, those members of staff who were not members of County committees claimed that there had been at best little consultation and at worst no consultation at all on the structure and content of units' (External observer, College M).

193. Further reasons for non-collaborative developments appear to be 'the increasing competition between colleges, the delays caused in the development process, and the opportunity which TEC provided for colleges to devise their own distinctive schemes'. An interesting case was encountered where a previous ONC collaboration had been replaced by individual college submissions and operation.

'In the 1960s the heads of about a dozen engineering departments in several local education authorities had combined to produce annually a common ONC examination scheme. An examination paper was written by a lecturer in one college, circulated by his head of department to the other participating colleges for their comments, and then printed and distributed. Scripts were marked by the paper's originator. Three or four committee meetings were held each year to organise the scheme and review its operation and to discuss new developments.

'A study of the committee minutes shows that the new TEC proposals became a regular item of committee business in 1973. In 1974 each college was allocated certain units to produce in draft form and the possibility of a joint submission began to be discussed. In the first half of 1975, officers of the committee paid several visits to TEC officials to discuss policy and the activities of the group, and in the summer of that year the draft unit syllabuses were submitted to TEC for comment. By June the idea of a full joint submission had been abandoned as unlikely to meet the requirements of the different colleges, but the value of sharing common units and assessment schemes was still asserted.

'In early 1976, the suggestion was made that the committee might moderate college programmes rather than submit its own. By the summer, it was noted, co-operation between small local groups of colleges was beginning and other colleges were going ahead independently. The committee's intention, as shown in the minutes, was changing:

> *"Preparation of programmes seemed well advanced in most colleges and the committee felt that it may be possible to find common ground for group activities when the individual programmes have been completed."*

'During 1977, as programmes were submitted and approved, the TEC agenda item was the occasion for discussions, not proposals to act, although some committee members still hoped that some commonality could be forced or found and then exploited. That was made less likely by a survey carried out late in 1977 of the treatment by different colleges of the same standard units: assessment plans and teaching schemes were found to vary widely. In 1978 and 1979, committee time given to TEC much reduced, was merely taken up by announcement of new developments.

'The reasons for the failure to co-operate, as suggested by the Head of Department and supported by the minutes, were numerous: the increasing competition between the colleges, and the opportunity which TEC provided for colleges to devise their own distinctive schemes. Another possible reason

for the failure is the opposition of a few members of the committee, to some of the central ideas of the TEC proposals.'

Illustrations of the development process leading to independent single college rather than joint submissions

194. The first example, the development of an A5 Certificate programme, illustrates that disparate college size, resources for development, and situation in different LEAs may impede collaboration.

'The Departmental initiative was superseded by a college initiative to establish a curriculum development consortium for the region at the suggestion of TEC, initially comprising nine colleges. However five made no active contribution and dropped out very quickly. [They] decided on a "waiting" policy. Also TEC circulars were then published which indicated that colleges could make individual submissions. The work of the consortium resulted in a draft submission to TEC. Two colleges made use of the "cockshy" submission. It was a very real decision for them to opt out. The reasons were that they had different LEAs and the difficulties experienced in arranging convenient meetings. One relatively small college felt overshadowed and wished to utilise Standard units whilst [we] wished to maintain the original TEC philosophies. Standard v. College based units is the "seed" of the split in relationships. Inter-college submissions are fraught with difficulties. Getting people together from other colleges is difficult, getting people to form a common policy is almost impossible. Different industries, in different localities generated problems. Level I Units were easier than Level III. The whole process of inter-college submissions was laborious and time consuming' (Head of Department, College H).

195. A second illustration, a C1 Science Certificate programme, shows how geographical considerations inhibited joint-development.

'The Regional Advisory Council, prompted by an HMI, called together the Heads of Science departments in the region in an attempt to co-ordinate TEC provision. The region was divided into a number of sectors. The changes of any kind of joint action, however, according to the college Head of Department (who was Chairman of one of the sector committees), were slight. There was no co-operation between Science Departments in the region and the purpose, value, or method of operation of such a scheme were unclear. Only a few colleges were planning to offer TEC programmes and these were too far apart to permit a joint submission or a collaborative scheme. One cluster of colleges broke away to form a local group and others dropped out altogether. A final inhibitor was the realisation that the colleges would need to consult individually with employers and professional bodies. "I think we all realised, actually, that if you were going to produce a programme and you had to go up – you had to call a meeting every time you were going to discuss something with [other colleges] – that it was just the sheer mechanics of collaborating actually." In 1976 meetings ceased and committees were allowed to die' (External observer, College N).

Perceptions of teachers of the advantages and disadvantages of joint-submissions

196. The most frequently perceived advantages of joint-submissions were the potential opportunity for *'the establishment of common standards'* and *'common assessment schemes'* across colleges, the *'sharing of expertise'* and *'cross fertilisation of ideas'*, and the *'sharing of the workload'* involved in their development (Table 30). Other more commonly identified advantages were *'the rationalisation of provision, the common approaches and the use of common units'*. Among the miscellaneous responses which were identified by several teachers in the sample were *'the opportunity joint-submissions can provide for the constant monitoring by several lecturers who carry out the same unit, backed by regular meetings'*, and the *'possibility of greater influence on TEC'*.

Table 30 *Teacher perceptions of the advantages and disadvantages of joint-submissions of programmes to TEC*

	% of teachers who expressed this view*
a. Advantages of a joint submission	
Common standards, common assessment	33
Sharing of expertise, ideas, viewpoints	31
Sharing of workload, time saving	22
Eases transference of students between colleges	14
Rationalisation of provision, common approaches	14
None	2
b. Disadvantages of a joint submission	
Time involved in arranging travelling to and attending meetings	33
Need for compromises with other colleges thereby not meeting the needs of local industry	18
More difficult to cater for divergent needs of local industry, and for students' needs	18
Communication difficulties between colleges	16
Delay and/or difficulty in making programme amendments	11
Administrative, organisational difficulties	7
None	4

* [Note: of the total respondents [N=362] to the questionnaire 36% did not respond to a. and 43% did not respond to b., these mostly being teachers not involved with joint submissions. In addition to the above classified responses, a range of miscellaneous responses were given by approximately 11% of respondents to a. and 26% of respondents to b. (see Part 2D).]

197. The collaboration in joint schemes means a great deal of time is spent in travelling to and attending meetings, this being the disadvantage most frequently identified by teachers. Other commonly identified disadvantages were *'the need to compromise with other colleges'*, which may not be in the best interests of employers local to a particular college. This seems particularly to be the case where a large number of small firms comprise the local industry. However set against this teachers believe that potentially a joint scheme can make it easier for students to transfer from one college to another. Little evidence was obtained to suggest that students are yet (1979-1980) studying units of the same joint-programme at more than one college, and it would appear that relatively little transference of students between colleges for programmes leading to the same award occurs. However indications were obtained of the value of collaborative development between colleges offering only the lower awards (TC and TD) and those offering the higher awards (HTC and HTD). In such instances the ease of transference of students to the higher level programmes can be enhanced. Nevertheless such potential gain may not be realised, and in the words of one of the evaluation team, *'it is evident that conflicts may arise where FE colleges favour the "practical" at the expense of the "theory", and HE colleges favour the "theory" at the expense of the "practical"'*.

Further disadvantages identified by respondents included communication difficulties between colleges, delay or difficulty in making amendments to programmes, and general organisational or administrative difficulties.

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Experience of the operation of unit degree courses has been appraised in a paper of the Nuffield Group for Research and Innovation in Higher Education, appropriately entitled 'The Container Revolution' (Mansell, A et al, 1975). This and other accounts (Boardman, 1977) show that a unit structure is inherently more complex than the traditional course structure, with respect to administration, assessment and guidance, and leads to heavier administrative loads and demands on teachers.

Thus many of the experiences of introducing TEC programmes are not unique although in this case the effect of TEC Guidance Notes No. 1 (on objectives) and No. 2 (on assessment) have added further complexity.

During these early years of TEC programmes it is not surprising that the potential advantages are overshadowed by the immediate experiences which are reported more vigorously. For many of the advantages to be realised, changes in the organisation of institutional structures and practices are required. For example if a student enrols into a programme identified for a specialist technician within a specialist department, his flexibility with respect to choice of units may be limited. On the other hand if a student enrols into a programme identified with the college as a whole in which Level I and Level II units are organised on an inter-departmental basis, greater opportunities for alternative study routes are likely to exist to meet his job requirements and aptitude.

Implementation

Introduction – the unit structure

198. TEC policy favoured the development of programme structures comprising units with the intention that flexibility should be a feature of the programmes. TEC's definition of a unit is 'a self-contained and significant component of a programme which may be separately assessed and if successfully completed, count for credit towards a student's award' (Policy Statement 4.1).

The characteristics and potential advantages of a unit or modular course structure were identified in a CNAA paper issued soon after the publication of the TEC policy statement (see Billing, 1974).

In principle a unit structure can

a. enhance course flexibility and the availability of student choice, for example by allowing alternative study combinations and students to change study areas, and accommodating adult and mid-career students to study one or more units relevant to changing job demands;

b. enable an award to be gained by the achievement of a sufficient number of credits for individual units, and allowing a profile of student attainment to be presented;

c. enable resources to be used more effectively, for example, by accommodating part-time and full-time students on one programme, allowing change in part of a programme without change in the whole, making viable student attainment to be presented;

d. facilitate effective teaching, learning and assessment through the explicit specification of the curriculum of the self-contained units.

The work activities of teachers

At the time of this enquiry teachers were spending a greater proportion of their time on tasks associated with the assessment of learning than they did previously with the corresponding CGLI and National Certificate courses which have been replaced. The effect of TEC policies

The demands upon teachers and their work activities

Activities associated with the assessment process

199. The most demanding aspects of the TEC programme for most teachers are those concerned with the assessment process. This has been confirmed quantitatively in the component study on the work activities of teachers* (see footnote on opposite page). Teachers (over 70%) who completed the checklist of work activities identified that they spent 'more time' with TEC programmes than with the CGLI and ONC courses replaced, on such tasks as:

'marking test papers or internal examinations' (91%);

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on their teaching activities appears to be much less, although there is some evidence to suggest that there is more collaboration between teachers, and also more preparation of 'handouts' for students.

TEC programmes have demanded a proportionately greater time on preparing for teaching. This could be expected to accompany any major change in a curriculum framework or policies.

Nisbet (1975) writing about curriculum development says:

'The most immediate effect when anyone introduces some new procedure is that everyone has to work harder . . . In the new situation there are no familiar routines to fall back on; and the activities which normally look after themselves, which are carried out routinely and automatically have to be planned consciously and deliberately'.

> 'discussing methods of assessment with colleagues' (87%);
>
> 'compiling assessment plan for the course' (72%);
>
> 'determining student grades' (70%);
>
> 'writing short answer test items' (72%).

A high proportion of the teachers also spent 'more time':

> 'discussing course arrangements and students' work with external examiner or moderator' (67%);
>
> 'supervising testing sessions as a part of classroom teaching' (65%).

Activities associated with the teaching process

200. In contrast to the increase in time which teachers say they spent on activities associated with the assessment of learning, teachers indicated that the implementation of TEC programmes had made relatively little difference to the amount of time they spent on more student centred teaching methods – eg 'using study kits, programmed learning materials or learning packages', 'supervising students during laboratory, workshop or other practical sessions', 'helping students with academic difficulties outside class time', and 'providing opportunities for students to practise problem solving exercises'.

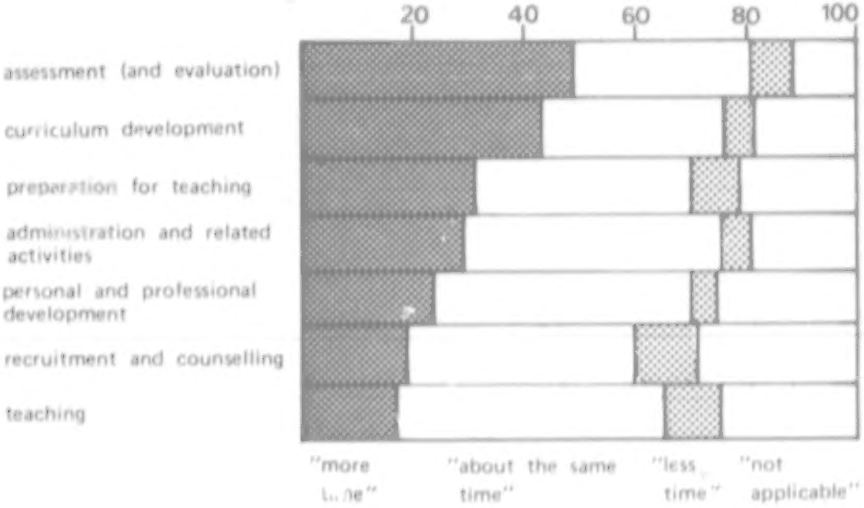
Other activities demanding more time

201. Activities, other than those associated with the assessment process on which more than half of the teachers responding identified that they spent 'more time' than with the corresponding CGLI and NC courses replaced, related to the interpretive and developmental work necessary to implement the new curriculum. Thus 'more time' was spent on:

> 'reading guidance notes and circulars issued by examining or validating body' (74%);
>
> 'working as a member of a team to develop new course or modify existing course' (68%);
>
> 'attending departmental or section meeting' (59%);
>
> 'discussing ideas for new course or modification of existing course with college colleagues' (57%);
>
> 'preparing student handouts and worksheets for class distribution' (51%);
>
> 'discussing timetable arrangements with colleagues' (50%).

---

* Teachers of TEC programmes were invited to complete a checklist (116 items) of their day-to-day work activities (paragraph 21 and Part 2A) concentrating on the autumn term 1979-80. When response items are grouped into the major categories used to draw up the checklist then the rank order in terms of all respondents (expressed as a percentage) who indicate that they spent 'more time' now with TEC on items in the category is:



Further data will be found in Part 2A of the Report.

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The work activities of teachers

The evidence, from a small sample of teachers of the time spent, on average, during a week in February, on all work related activities of 37 hours is similar to the data reported as the average hours of work per week undertaken (all courses) by FE teachers in a survey with almost 2,400 respondents. FE teachers of engineering and technology worked on average 36 hours per week during term, and teachers of natural science 39 hours per week (Bradley and Silverleaf, 1979). It is important to note the wide distribution of hours worked by individual teachers reflecting perhaps both an inequitable distribution of work load and the individual personalities and characteristics.

Teachers with course organisation responsibilities seem to spend proportionately less time on preparation for both TEC programmes and other courses than do teachers with no TEC responsibilities.

Generally speaking it appears that the more time a teacher spends on TEC related activities including teaching, the more hours he works in a week (see Part 2A – the impact of TEC on the day-to-day work activities of teachers).

Administrative tasks and paper work

The paper work and associated administrative tasks associated with both the development (programme design and submission) and operation (internal assessment and recording procedures) has both central, TEC, and college origins. TEC required the detailed specification of unit content, in objective-format, and assessment plans, and the transfer of details of student registration and achievement to central national records. Colleges devised assessment plans in an attempt to meet TEC's requirement. It appears that

For a majority of activities (more than 60% of items in the checklist) the number of respondents indicating that they spent 'about the same time' on the activity concerned exceeded the number indicating that they spent 'more time' on the activity. This is relating to the admission and recruitment of students, teaching methods, lesson planning and professional development.

Distribution of time spent

202. Fifty-six full-time teachers completed a work diary during a seven-day period 18-24 February 1980. They spent an average of about 37 hours (minimum individual responses 20 hours, maximum 60 hours) on all work related activities – TEC programmes and other courses. Twenty per cent of respondents indicated that this particular week was not entirely representative of a year's work load and that during a 'typical' week they would probably work more hours than shown in the diary.

203. The three principal categories of work activities to which most teachers allocate the majority of their time were categorised as 'preparation for teaching', 'teaching', and 'assessment'. The balance of time spent between these and other functions, eg 'course administration and liaison', 'recruitment and counselling (of students)', is likely to depend on the responsibilities of the individual teacher for course organisation. An illustration of balance of activities of a sample of teachers showed that those without special responsibilities for TEC programmes (eg as programme supervisor, course tutor) spent, in the case of their work associated with TEC programmes about twice as much time teaching as they did preparing for it, and about twice as much time on teaching as on assessment activities (Figure 12A). In contrast, for those aspects of their work associated with non-TEC courses, the same teachers indicated that teaching activities accounted for a greater proportion of their time, the time they spent teaching being some five times greater than the time spent preparing for teaching, and some ten times greater than the time they spent on assessment activities (Figure 12B).

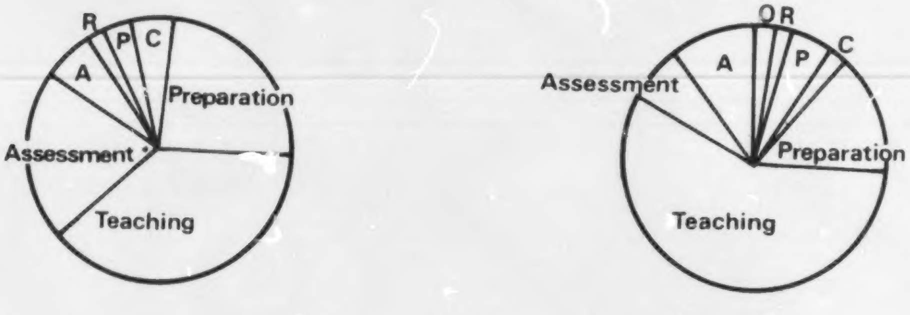
204. Members of the evaluation team report, 'that the more time a teacher spends on TEC related activities the less time he will spend on teaching on other courses . . . and the longer he will work in the week. The reason the heavily committed TEC teacher works longer hours is because he spends more time than his other colleagues on the TEC related activities such as curriculum development, preparation, assessment, recruitment and counselling, professional development and administration and liaison. . . . The introduction of TEC programmes seems to have resulted in more teachers having a greater involvement in the time consuming non-teaching activities connected with running courses. These teachers have found themselves working longer hours'.

205. Teachers with special responsibilities for TEC programmes (eg programme supervisor, course tutor) spent a similar time allocation to the activities associated with teaching and assessment, as those without such responsibilities (Figure 12B). However they spent proportionately less time on 'preparation for teaching', and more time on 'administration and liaison'.

206. **Note:** Further analysis indicates that, in the particular week in question, the ratio of the amount of time the teachers spent in teaching to administration/liaison activities was slightly greater in the case of their work associated with TEC programmes, than in the case of their work associated with non-TEC courses – teachers without special responsibilities: TEC programmes 8.8, non-TEC programmes 6.5; teachers with special responsibilities: TEC programmes 3.1, non-TEC programmes 2.4.

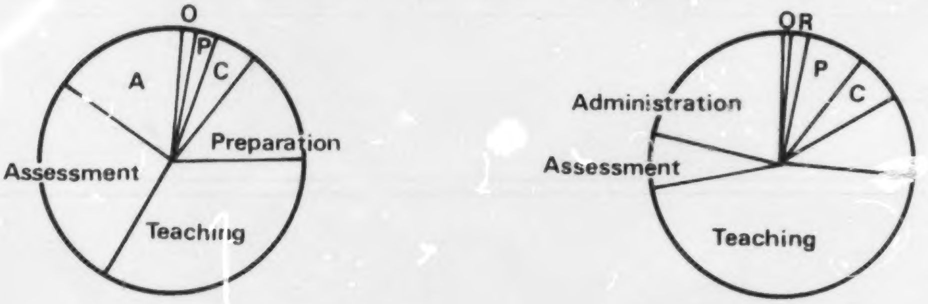
207. Whilst this information (paragraphs 205 and 206) related only to a relatively small number of teachers and is therefore illustrative rather than totally representative of practice the evidence concurs with independent reports of members of the evaluation team, based on their visits to colleges.

Figure 12A *Proportion of time teachers, without special course organisation responsibilities, spent on major categories of work during the seven-day period 18-24 February 1980: (a) work associated with TEC programmes; (b) work associated with other courses.*



(a) work associated with TEC Programmes (b) work associated with other Courses

Figure 12B *Proportion of time teachers with special course organisation responsibilities, spent on major categories of work during the seven-day period 18-24 February 1980: (a) work associated with TEC programmes; (b) work associated with other courses.*



(a) work associated with TEC Programmes (b) work associated with other Courses

Key = C = Curriculum Development, P = Professional Development,

R = Recruitment and Counselling, A = Administration/Liaison, O = Others.

neither TEC nor the colleges were able to anticipate at the design stage, before operation of the programme, the consequences of their policies and response.

When teachers say that the introduction of TEC programmes has caused more administration and paper work, it seems that they are referring mainly to the work which they associate with the assessment procedures as administrative in nature, for example: the setting of questions, arranging for the typing of papers, checking papers, marking, recording marks, making marks and comments available for a programme co-ordinator. For many teachers their involvement with the detail of the assessment process represents a significant change in role, from helping the student to 'beat the

Thus, for example, *'twenty-eight of the thirty TEC programme organisers spoke of the greater amount of work devolving on teaching staff. . . . The assessment burden means not enough time is spent on teaching preparation . . . the time and effort necessary to prepare phase tests is particularly noticeable'.*

208. When teachers who completed the checklist responded in their own words to a sentence beginning 'The biggest single change in my day-to-day work activities as a result of the introduction of TEC programmes has been . . .' by far the two most commonly occurring responses could be classified as 'the increase in record keeping and administration' (33%) and 'more assessment and marking' (30% of respondents).

In responding to items on the checklist generally, not as many teachers indicated that record-keeping occupied 'more time now with TEC' as those who responded 'more time' to items associated with the assessment process. Although, for example, the items 'maintain record of students' marks for classwork or practical work', 'maintain record of students' homework marks' and 'maintain filing system' received responses of 'more time' by 45%, 35% and 51% of respondents respectively.

209. Much of the record keeping and administration referred to by teachers in open-ended discussion about the implementation of TEC programmes with members of the evaluation team, appears to relate, in fact, to the

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examination system' to helping the student meet the demands of the internal assessment requirements. A provision which gives the teachers a greater share of the responsibility for the assessment of their students, and which requires external control through validation and moderation will almost inevitably require more documentation of intentions, practice and performance.

Record keeping

Most colleges have introduced new procedures to record details of student entry qualifications, achievement and progress. The need for new procedures has arisen as an inevitable consequence of the adoption of the unit course structure, and the assessment practices resulting from TEC policies. In previous technician course provision most of the students enrolled on a particular CGLI or NC course would be a member of the same group of students throughout the two or three years of study, leading to the qualification. In the case of the 'equivalent' TEC programme, students now enrolling on the same day, may, during their course of study take different combinations of units and, subject to their performance and the flexibility provided by the college, progress throughout the units at different rates. Students don't characteristically 'belong' to a single class but to several groups.

organisation of the assessment process, ie the tasks of setting, typing and copying of phase tests, the associated marking and keeping of records of marks, and making records available to course tutors or programme co-ordinators, such records to be available for the TEC moderator if requested.

'Paperwork' associated with TEC programmes

210. A criticism frequently made by teachers pertained to the 'amount of paperwork' generated with the introduction of TEC programmes. For example members of the evaluation team reported, in the case of an A5 programme that:

'much more contentious is the issue of the excessive paperwork which lecturers are required to do. Without exception, everyone expressed strong views that what appears to them to be an encroachment on their status as teachers by the "petty" paperwork which TEC introduced. Two points frequently made were: (1) their needless involvement in paperwork which distracts from and robbed them of useful preparation time; (2) the increase in actual work load which these procedures entailed, without recompense in either contact relief or in terms of case' (College M).

211. In the case of a C1 programme:

'the administrative work too is considerable. At the last count there were between six and eight TEC based proforma to be completed and checked carefully at various times throughout the session, together with other college-based record and report cards' (College J).

212. And in the case of a B2 programme:

'the amount of paperwork was the most significant response (82%) made by teachers [N=22] to the question: what do you think are the worst bits of TEC'. [Note: the converse question was also asked!]

Record keeping

213. Many staff have spoken of the burden of record keeping attributed to the introduction of the TEC programmes. . . . 92% (participants at two Study Conferences on Evaluating TEC Programmes) responded very vigorously that with very few exceptions a great deal of record keeping had been taken over by teachers. . . . A bewildering array of course documentation was submitted which derived from the idiosyncratic characteristics of both programmes and assessment plans. Very few recording systems were simple; most were extremely elaborate (Coombe Lodge Report, Vol. 12, No. 6, 1979, page 292). In the words of a Programme Co-ordinator, *'it has to be remembered that the introduction of TEC programmes and continuous formalised assessments has substantially increased the burden of administration quite independently of TEC's external demands'* (College F). Whilst some developments *'recognised that the complexities of the assessment plan made the production of a matching recording system desirable, . . . what was not foreseen was the sheer scale of the record keeping exercise taking into account, Student Unit Report forms, Student Registration and Reports to Employers. There has been a reaction against the additional work which is caused especially in relation to the record keeping activity. It is noticeable that there is more reaction from colleges previously involved in City and Guilds schemes than those with ONC/HNC experience'.* (Programme Co-ordinator, County Scheme.)

214. The following extract from an account of the introduction of an A5 programme illustrates the problems encountered and the seeking of solutions on the basis of experience:

'In 1978-79, when there were two year groups and the complexity of the scheme was increasing, it was realised, with some dismay, that the traditional

class register was no longer appropriate and that unit registers would have to be introduced. Checking student attendance under the new system has become a laborious task, requiring as it does the collation of several different registers.

'The identification of a student's current programme of study was also made more difficult by the disappearance of coherent classes and single class registers. Telephone enquiries from employers could not be quickly answered. From 1979-80 the problem was solved by one of the senior members of the Department who drew up a single alphabetical list of students on the programme showing the units that each of them was taking in that year.

'The same year saw the adoption by the Department of the new standardised Student Record Card, devised by the College TEC Co-ordinating Committee. On the front is entered the personal details of the student and on the back is listed the student's attendance and grade in each unit of the programme. The card forms the second stage of the College registration procedure. The first stage is the completion by the student of an enrolment form and the third and fourth are the completion by a senior member of the Department, of the TEC registration forms and an internal college registration card' (College E).

Registration of students with TEC

215. TEC required that new students commencing in autumn are to be registered with TEC by the following 15 January and that the registration process would be in two stages. Colleges have found the registration process troublesome and the two-stage process educationally and administratively undesirable and have sought alternative solutions as illustrated by the following case:

'To meet the deadlines of the internal college procedures a decision on the suitability of each student for the programme and/or a specific combination has to be taken by the end of November. In the view of several senior staff the date is too early for the teachers to have judged the students and the students to have decided on particular combination of units. Some reluctance is felt at charging students and their employers £12.50 for a programme which might turn out to be too demanding, a possibility which is increased by a sympathetic admissions policy. In marginal cases registration of a student is now delayed until the second year when all parties can feel confident in their decisions. Credits are awarded for successful completion of Level I units' (College E).

The adoption of Standard units by colleges

Reasons for adopting Standard units

216. With limited resources and experience to devote to unit development some colleges waited for Standard units to become available. Others which had involved staff in attempting to write college units then decided to adopt similar Standard units and submit these rather than their own. They perceived this to be a surer way to achieve successful validation of their submission.

Extent of adoption of Standard units

217. Standard units were widely adopted by colleges in their Certificate and Diploma programme submissions (Data for period 1975-78). An analysis of

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The keeping of full records of students' progress is clearly an essential part of the teacher's role, and can assist the process of effective guidance and counselling.

Although TEC do not require colleges to provide evidence of student attendance, colleges feel it is necessary to keep detailed attendance records usually on a unit-by-unit basis. Such data is needed in communications with the students' employers. Also the formal allocation of resources can in part be determined by student hours of attendance.

However where possible it is suggested that students are given the responbsibility of indicating their attendance by signing a register one or more times as necessary on each visit to the college.

Programme administration

Much of the implementation of validated programmes appears to be characterised by responding to problems as they occurred rather than prior anticipation of needs or difficulties. This can be attributed largely to the substantial changes in practice which many teachers were required to make. Continuing change is a characteristic of curriculum development although had evidence from trial developments been available some unfruitful experimentation might have been avoided.

TEC have responded to the problems experienced by colleges and from the 1981-82 session the registration fee will be payable in a single instalment.

Adoption of Standard units

In spite of the criticisms which were raised about the quality of the expression of the objectives in some of the Standard units, many colleges adopted these, rather than continue to develop their own units, as they became available. This reflects the limited expertise in many colleges at writing objectives in the format advocated by TEC, the lack of time and resource to devote to this, and the belief that to submit Standard units where these were available would facilitate validation of the programme.

Thus relatively few programmes comprised solely or almost solely college-devised units. Most programmes contained mainly Standard units. Colleges either developed their own college-devised General and Communication Studies units or in the case of some joint-submissions adopted units designed collaboratively.

the balance of programme content in terms of Standard and college (devised) units in this work was undertaken in the case of Mechanical Engineering A5 (231 programmes), Building Studies B2 (Certificate 28, Diploma 6) and C1 (66 Certificate programmes). [In the case of A5 and C1 programmes these were the number of programme Specifications on TEC computer records in February 1979, and in the case of B2, an approximate 20% sample.]

A5 Programmes – More than half of the colleges (53%) had programmes comprising units at least 75% of which were Standard units. Since the General and Communication Studies units, accounting for about 15% of the programme, are invariably college designed, TEC providing no Standard units in this area, in more than half of the programmes 90% of the technical units were Standard units. Less than 15% of the programmes contained more college designed than Standard units.

B2 Programmes – The B2 Certificate Programmes comprised almost entirely Standard units, excluding the college devised General and Communication Studies units. Most of the Diploma Programmes submitted before 1978 are non-unit programmes.

C1 Programmes – C1 Certificate Programmes contained rather more college devised units than A5 or B2 Certificate Programmes. Over 60% comprised at least 60% Standard units (ie 75% of the technical units were Standard units and 25% college devised).

Rate of adoption of units

Standard units which are core to the study of a particular programme area are adopted rapidly. On the other hand some more specialist units are in use in relatively few colleges. The data illustrated the decline in usage of a unit as a later version becomes available.

Rate of adoption of units

218. The rate of adoption of Standard units is illustrated (Table 31) for those units sampled in this study (Part 2B).

***Table 31** Extent of adoption of selected Standard units*

		Number of programmes using these units*			
Unit title	Unit code stating year of issue	March 1978	December 1978	May 1979	June 1980
Physical Science I	U75/004	525	864	1,084	1,214
Engineering Science II	U75/036	68	96	84	89
	U76/053	74		221	248
Manufacturing Technology III	U75/050	57	78	65	79
	U76/057	66		200	262
Construction Technology IIIA	U75/075	51	103	148	188
Chemistry II	U76/019	10		139	180

* Data from TEC computer records.

Some units were taken up in only a few programmes. For example 55% of the units issued with codes dated 1975 and 45% of the units dated 1976 were in use, in 1978, in not more than 20 programmes.

Amended units

The relatively small amount of amendment to Standard units is further indication of the lack of time and experience for in-college curriculum development.

Amendments to Standard units

219. Colleges may submit amended Standard units as part of their programme. A validation form, Val IVC, is available for colleges to list amended aims, and add, change or omit objectives. The extent of amendment by colleges was very small (less than 5% in the case of A5, virtually nil in the case of B2, and about 10% in the case of C1 programmes).

FEU Commentary

The unit structure: alternative combinations and choice

TEC wisely constrained the choice of units available in a programme by requiring each combination of units to be validated in an attempt to ensure coherent patterns of study.

Where many alternative combinations of units were proposed at the design stage, experience shows that on implementation their availability can be severely restricted by factors such as student numbers, employer and teacher influence, teacher availability and expertise.

In any one programme (A5, B2, C1) normally not more than four combinations are likely to be provided simultaneously. Where programme enrolments are relatively small the alternative to a fully modular programme in which Standard units are grouped as a core with options in the final year of study, may be appropriate.

Since alternative combinations may be more or less academically or practically orientated, the worth of an award cannot be simply related to a measure of intellectual achievement. Whilst within each combination in a programme, units individually should have integrity, and collective coherence, alternative combinations will not be directly comparable.

The unit structure: choice of units

Students' decisions when provided with a choice of alternative units will be influenced by a variety of factors. Thus, employer demands, peer group pressures, and perceived ease or difficulty of units and the perceived work-load, feedback from previous groups of students all contribute to influencing whether the choice is appropriate, rational, or unduly constrained.

Colleges which anticipate a range of alternative combinations at the design stage are more likely to provide a more flexible provision. Once a

Combination and choice of units

220. Colleges state on a TEC Validation Form (Val IIIU(iii)) the alternative combinations of units which might be taken by the student. Typically the number of optional combinations, in each Certificate Programme, each designed to meet the needs of differing technician functions and their associated activities, submitted vary from (2 to 4) A5, (6 to 7) B2 and (1 to 4) C1 although in the case of some programmes no alternative combinations are available. Exceptionally a few schemes offer a complex array of combinations (eg examples of twenty-eight in an A5 programme, twenty-six in a B2 programme have been noted).

221. Evidence from the case-study work suggests that colleges with even as few as six alternative combinations have been unable to offer all the alternatives validated. Factors which limit the provision include: timetabling constraints and resources and teaching staff availability, relatively small student numbers wishing to take a particular unit, constraints imposed by employers or by professional institutions. In the following report of a Science Programme the constraints of a Professional Institution and of student members are evident:

'At the end of the 1978-79 academic year the Course Organiser circulated a questionnaire to the Year 2 group in which students were asked to specify certain qualifications, their career ambitions, and other interests. Which option units to offer would be determined by the information supplied. Before any decision could be taken, however, a circular was obtained from the RIC and seemed to show that the Institute's requirements could only be met if the students took the two half units. In 1979–80, therefore, all the Year 3 group students (except two who are "hidden" in another unit) are studying in two half units. Some might be better suited elsewhere but they are too few to make a class.

'The same programme has a Chemical Technician combination which offers a choice of one unit from three. For 1979-80 no choice was offered (only three out of six students progressed from Year 2 to Year 3) and all are studying a level III Unit in Safety and Hygiene. The Head of Department and Course Co-ordinator saw a number of advantages in this unit: there was a specialist on the staff; the less academic quality of the combination suited the students and by careful publicity it was possible to attract people from industry in order to ensure a respectable class size. About a dozen people attend the class and are willingly taking the tests and submitting work.

'However not all teachers who wrote and would have taught the rejected options are happy about the outcome. As one of them described the system, "they are College options, not options for the students".'

222. In the following illustration the Head of Department offering an A5 programme raises the implications of study combinations of varying academic difficulty:

'A rationalisation of the number of routes of study from the ten routes approved (by TEC) to six with viable student numbers has occurred, with a demand by industry to have a clearer picture of the course routes which will be four by next session. It has been found that many students have taken the "path of least effort" through the TEC unit system, with a short-fall of at least 15 students on the academic two-year route. It was expected that 40 students would complete, but this appears to be now only 25. It could be said that transfer in the previous course provision from ONC to MET was a serious downgrading for a student, but not so when transfer is from one KO combination to another on a TEC course. The student knows he is still on TEC, but what is his worth to industry? His employer recruited him on the basis of a good mathematics/science attainment, yet the student completes TEC with practical units and a minimum attainment of level II in mathematics'.*

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* KO refers to the number of the unit combination identified on the TEC validation form.

FEU Commentary

programme is validated teachers may feel constrained to meet the needs of students within the existing structure and not wish to actively seek approval for additional combinations before revalidation of the programme as a whole is due.

Units designed and offered by colleges are often the result of different pressures and perceptions of teachers. Care must be taken to ensure that the curriculum and units made available reflect first and foremost the needs of the students whilst recognising the particular expertise particular teachers are able to contribute.

The unit structure: timetabling

If the potential advantage of a unit course structure is to be fully realised, allowing students of different programmes to join groups studying the same units, it is clearly necessary for the college to have a common timetabling period of one or two hours, or some other agreed value is required. With such provision in the case of degree programmes, it has been suggested that timetabling need not be a major problem (Boardman, 1977). Where this is not the case, the advantages to be gained from the unit structure in terms of both efficient resource usage and student choice are minimised.

In any event, realisation of the potential flexibility of unit courses is limited in the case of those students whose employers are only prepared to release them for study within the confines of a single day each week. For the necessary opportunities to be available a more flexible pattern of student attendance at college may be required.

In providing the optimum conditions for learning there are tensions to be recognised. Whilst the grouping of students of different programmes, eg, electrical, aeronautical, motor vehicle, medical laboratory technicians, to study common units, say mathematics, physical science,

223. The availability of several validated combinations can allow, however, a college to more easily accommodate students in meeting both employers' requirements and students' level of attainment. Thus, a co-ordinator of an A5 county scheme reported that:

'The original (Mechanical Engineering A5, joint submission) contained six combinations, the last two of which were really feelers to see how flexible TEC could be. The intention was that the first three combinations (academic, Design and Production) would be the commonly used ones. In practice some colleges had difficulty – or at least made mistakes – in interpreting the combinations and so the last two combinations have, in fact, been used since they could cope with the majority of the aberrations.

'Some companies pressed their technicians to take Mathematics III although the Design and Production combinations did not make provision for this. Thus some students took the academic combination when it was not really appropriate to their needs. When some students changed their minds about studying Mathematics III, after completing the prerequisite Mathematics (2) B II, then the original combinations could not cope with this because Mathematics (2)A II was planned to be the terminal Mathematics unit' (Programme Co-ordinator, County scheme).

Timetabling of programmes and units

224. In the case of day release courses in particular there are major problems of scheduling the various levels of units and combinations to enable the potential flexibility to be realised. Employers willing to release students for a single full day are dissatisfied with any arrangements which either leave the students out of class during their day's release or require additional release on other days.

225. Members of the evaluation team who visited 30 colleges reported that *'In small colleges where units at Levels I, II and III are likely to be taught by a single member of staff, different days must be used for each Level while those units most usually "trailed" (Mathematics I and Physical Science I) are frequently offered in the evening session so that students can come out of employment hours. In medium-sized and large colleges the tendency was to offer Levels I/II on one day and II/III on another so long as adequate staff were available. Teachers accepted that not every contingency could be planned for all, in some colleges if students fail a unit, individual arrangements were negotiable with their firms.*

226. *'Where timetabling problems occur they are attributable to one or more of the following reasons:*

a. *a general lack of rooms of varying size to accommodate the different populations (in number) of student groups;*

b. *the range of options that students might be offered;*

c. *the organisation of re-sit or re-scheduled phase tests;*

d. *in small colleges, the availability of staff;*

e. *in some colleges, a shortage of laboratories of different kinds'* (Part 2B).

communication studies, is theoretically attractive from a flexible timetabling viewpoint, teachers frequently indicated their belief that technician students may learn best and be taught more effectively when working together in a group who share a common vocational intent.

Many programmes are timetabled so that units at two adjacent levels of the same area of study are available simultaneously in the same timetable slot. Where college resource limitations prevent this and employers are only willing to release students for a single full day rather than say, two or three half days, the potential flexibility of the unit structure is limited.

Other factors in the college which limit the timetable's flexibility typically include: the non-availability of rooms of appropriate size and the numbers of teachers of particular disciplines, the latter being a feature more characteristic of smaller colleges.

The unit structure potentially should assist the timetabling provision to allow students of different aptitude to study at different rates. For example given a notional unit design length of 60 hours, the appropriate study time might vary from say, 50-70 hours, according to the needs of the individual student, with substantial opportunity for tutorial work for the students working at a slower pace. Whilst some colleges recognised such possibilities, generally the timetabling has adopted the previous norms of a group-paced system, in which the part-time day-release student attends a class situation for the whole of his working-time in college. This is encouraged, of course, by the practice of most LEAs to determine a college's teacher 'establishment' by reference to either last year's actual teacher class contact hours or next year's forecast class contact hours (Birch and Latcham, 1980). Colleges have also adopted the normal study rate of five units per year and have generally been unable to explore more flexible patterns.

227. A report of a joint County A5 programme states 'it has not always been possible to comply with the agreement that all colleges would offer Levels I/II and Levels II/III provision on the same day. The resource implications on staffing (exacerbated by the fact that the same number of staff cannot teach both levels simultaneously) and on classroom provision have sometimes proved too great, with the inevitable but unfortunate result that some students have been debarred from the exemptions to which they are entitled'.

228. Most colleges have constructed their timetables on the basis that 60 hours of student time in college should be devoted to the study of each unit, at a normal study rate of 5 units/year on a part-time day and evening basis. Among the patterns encountered with 2 hours/unit/week with study of 4 units on one day, and a further unit on a second evening, 1¾ hours/unit/week for 4 units with a further period for tutorial/problem solving/phase testing, and a 2 hour period for a fifth unit on a second evening; periods of variable length depending on the unit and its level.

Situations were encountered, attributable to the past traditions of different departments in a college, where different lengths of timetable slot were used in different programmes, with resultant difficulties in any attempt to realise the potential flexibility for accommodating students in common study groups for Standard units such as Mathematics I, Physical Science I, or General and Communications Studies.

229. An example of units of an A5 programme requiring evening only attendance was noted in which students were expected to study at the rate of 2 units/year (2 hours for 3 evening/week) following an earlier attempt to provide a rate of 3 units/year (2 hours for 3 evenings) which had resulted in a substantial fall away in student numbers.

FEU Commentary

The unit structure: counselling

A programme composed of units, in theory, offers the student more choice points than the structure of previous technician courses, at which to make decisions about his/her study path. A greater amount of teacher time is required, therefore, in helping students to understand the provision and the alternatives so that their choice is an informed one. For teachers to be effective in this role of counsellor they must fully understand the inter-relationship of the units and the structure of the programme as a whole. Colleges should ensure teachers of different units of the same and similar programmes are well briefed regarding programmes as a whole and not just constituent parts.

Colleges should consider setting aside a period of time in which students are encouraged, and where necessary requested, to review their progress with a member of staff. Those teachers undertaking guidance and counselling roles should receive appropriate training, as necessary to help them in this aspect of their work.

Counselling of students

230. One of the requirements of a Unit course structure with alternative study combinations is good academic counselling support for students, if the potential flexibility is to be realised. In the words of a Programme co-ordinator: *'Most colleges would claim that they have always counselled their students but TEC makes specific and much greater demands. We have had to try as best we could to train staff to undertake much more detailed individual counselling. Each applicant must be treated uniquely and have a programme designed to meet his (and his employer's) specific needs. I would estimate that our recruitment procedures initially occupy four or five times the number of hours that would previously have been spent by staff. To this we must add the hours spent in counselling as an on-going process. I must admit that we are not entirely conscientious in this respect and we tend to deal with problems as and when they arise rather than going out to look for them'.*

231. One of the colleges visited placed a special emphasis on the student counselling aspects of its work. A special TEC counselling committee was set up when the first programme was introduced in 1976 with regular meetings to monitor student progress. Counselling is arranged on both an individual student and group basis. Students are required to complete a job diary at monthly intervals and submit it to teachers in their role as counsellors. Individual teachers held a variety of opinions about the 'counselling aspect of TEC work'. In general a more favourable response was made by teachers of a programme area (B3) in which there was more staff involvement in the design phase than those of a programme (B2) developed mainly by the most senior staff. This may reflect the beneficial effect of teacher involvement in programme development.

The unit structure: assessment

In general, assessment plans were designed which proved too elaborate to operate in terms of the available resources and expertise. The problems which many colleges experienced could have been minimised had several colleges been invited to run a one-year pilot scheme.

It is a part of TEC policy that 'in unit-based schemes it will not be necessary for every unit to be assessed separately, for example assessment may take place on completion of two closely related units' (Policy Statement 4.5.1). In practice the self-contained nature of each unit with its own assessment analysis and plan has generally led to the assessment of each unit as a separate entity.

Implementation of the assessment plans

232. The assessment plans. The detailed nature of the assessment specification and plan for each Unit has generated much of the burden and many of the problems which teachers have described. Reports from a number of colleges illustrate the experience of attempting to operate the assessment plans. For example:

'The assessment plans of form Val IVA, subjects of much dismay at the development stage, were the component to the new scheme which was condemned most strongly by staff when speaking of implementation. Some teachers found them unworkable, others believed that they "rigidified the teacher", "destroyed the freedom of the lecturer to put his own stamp on the course", or "turned a teacher into an instructor". In addition, students in the first year of the programme's operation complained that they were being assessed too frequently. At the staff meeting of May 1979, the problem of TEC assessment plans was the leading item. Suggesting that the plans should be re-submitted to TEC, the Head of Department wrote in the agenda that: "A number of staff have voiced the opinion that our TEC students are being over-assessed, that the number of assessments per unit is too high and that the system really is getting in the way of the teaching".

'Due to our relative ignorance and inexperience we designed plans which led initially to over-assessment. This was a common error and I believe that the TEC guidance Note No. 2 was misleading in this respect' (College F).

233. Whilst the majority of teachers (76% of those who responded to the questionnaire – Part 2D) indicated that in setting assessment tests they

referred to details of the assessment plan, not quite half (47%) indicated that they 'ensure the tests matched the percentage identified for the categories of knowledge and skills (eg Information, Comprehension, Application and Invention) in the unit assessment analysis Val IVB', 40% expressing the contrary view that they 'do not give attention to the percentage identified for the categories of knowledge and skills' (13% being 'unable to answer').

234. Case study reports from members of the research team illustrates the variable practices, at the time data was collected.

'Assessment schedules were treated, for the most part, as guidelines rather than as prescriptive measures. There appears to be, therefore, considerable deviation in practice from the submitted schemes . . .

'Whilst in the process of assessment, attempts to apply TEC categories of information, comprehension, application and invention have been either ignored or quietly abandoned by most lecturers, many have continued to apply weighting to their assessment procedures. The attempt to apportion marks to categories is seen by all lecturers as impractical and as an example of this the lack of marks for motor skills in unit 75/005A Mathematics assessment schedule was noted by one lecturer. This, in spite of the large element of sketching, graph plotting, etc, which are essential parts of the content' (College M).

235. *'With the agreement of the moderator we have systematically redesigned the plans in the light of experience and they are now functioning reasonably well. There are still isolated problems, but nothing that cannot be resolved by the teaching staff. Among other things, we have abandoned any pretence of applying Bloom's taxonomy which defines a hierarchy of cognitive skills to be assessed. Personally, I regard Bloom's taxonomy as a valuable means of communicating different levels of cognitive skill to be assessed among academics and pedagogics. It provides a terminology, but to apply these notions to the practice of assessment for individual students is far too complex and fraught with difficulty' (Programme Co-ordinator, College F).*

236. *'The prescribed assessment processes are strictly adhered to in a detail which causes lengthy discussion of the percentage weighting of intellectual skills testing' (College L).*

237. **Phase-testing and re-testing of students.** Teachers have found themselves with new decisions to make about the course of action to be taken when students were unsuccessful in phase tests during the course of study of units. This has led, particularly in the early operation of schemes, to uncertainty. A diversity of practice has occurred; some of the alternatives are illustrated:

a. allowing only one re-sit of each test *or* as many as necessary to gain the pass mark;
b. crediting the mark obtained after re-sit, where satisfactory, *or* awarding a bare pass mark only (eg 40%) *or* the original mark of the first phase test;
c. requiring a pass mark for each discrete assessment point, *or* allowing the marks of each phase test to be taken forward and aggregated.

FEU Commentary

The adoption of the taxonomy proposed in TEC Guidance Notes 2 (see paragraph 61) resulted in implementation difficulties. Whilst some teachers have endeavoured to interpret the plans to take account of the categories of knowledge and skills it is clear that a very substantial number find this impractical.

Through discussion with the programme moderator, colleges have been able to legitimate the changes to their assessment provision in the light of their experience. The further guidance which TEC has given in response to problems experienced by colleges is discussed on page 46.

Phase tests and re-assessment

The requirement that students should attain a minimum performance (typically 40%) in each assessment component (phase test) of a unit, has presented considerable problems of organising re-tests for students unsuccessful at the first or possibly subsequent attempts. The argument that a minimum achievement in component objectives of the unit should be achieved during the course of study is at first sight attractive. In this way both the student and his teacher gain feedback during the course of the unit which can aid the student's further learning. However, to require students to achieve a minimum performance before continuing with further learning designed to achieve other, new, objectives may or may not be necessary depending on the nature and structure of the objectives. To require each component of the unit to be passed at stages during the course of learning assumes that the learning can be separated into neat packets in a way that objectives are typically grouped within a topic area together with corresponding assessment. How students learn is a complex matter. It may be that a student who does not reach the required minimum performance for a group of objectives at an early stage of a unit, will be able to achieve these after he has continued study of other related objectives. That is to say some students who tend towards a 'holistic' learning style may successfully achieve objectives at a later stage of the unit which they have difficulty in achieving earlier. Teachers have pointed out the need for students to have time to digest material. On the other hand, to retain a student who is obviously not coping, is not good practice.

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Phase tests and re-assessment

In the early development of TEC units and the often hurried drawing up of assessment plans, whether or not the units are assessed by phase tests only, or phase tests and end tests, may be a consequence of rather arbitrary decision. In some cases where colleges felt a need to exercise caution in putting a minimum percentage as high as even 40% the evolving characteristic practice expected by validation groups required such a minimum to be stated. In the further design and review of assessment plans it is suggested that course designers attempt to distinguish those assessment points for which it is considered essential for students to achieve a minimum performance before progression from those where such requirement is not essential, that is to say to distinguish more explicitly between testing as part of the process of learning, and testing to measure competence. In a unit in which all component assessments are of the former kind an end-of-unit test may not be required; in a unit in which phase-tests are primarily for feedback purposes an end-of-unit test will be required.

238. Extracts from case studies illustrate the problems colleges have experienced:

'The question of "re-sits" was glossed over in the early stages and a clearer policy on re-sits of phase tests has emerged. The logistics of organising re-sits was something that TEC had not considered and colleges have had to find out the hard way.'

'The problem of repeating units despite care in selection of students has been on a scale larger than anticipated resulting in fragmentary groups for some units in later years. It was anticipated that with continuous assessment, students would be self-motivated, and non-completion of units few. This has not been the case, despite the fact that students log their own results on a personal profile-assessment form' (College H).

239. *'At the meeting in July 1979 staff were also reminded of the rules contained in the submission, for treating students who failed a single in-course assessment. A student would be either (1) expected to perform well in later tests; or (2) give remedial work followed by a test; or (3) "be deemed to have reached the pass level [. . .] by virtue of high performance in previous in-course tests". The difficulties of setting and marking remedial work, apparently, tend to favour the adoption of the first and third of the three approaches. In addition, some staff believe that to offer more than one opportunity to re-take a test would be educationally improper and lower the academic standard of the course. One lecturer remarked that "we owe it to the employers to keep our promises".'*

'After discussion at Section Heads' meetings, two additional rules have been made as a result of the first year's experience: any student who re-takes a test can be awarded no more than the pass mark for that test; no student who has re-taken a test can be awarded a Merit in that unit. The rules were felt necessary to avoid treating unjustly "the middling bright who just get through each test" and to deter the less scrupulous from using a first attempt as a rehearsal' (College N).

'Assessment problems in the Mechanical Engineering Department were similar to those in the Science Department. The policy for students who fail in, or are absent from, in-course assessments is the same and comes from the same source. The practice of the Engineering Department differs in that students who fail a test in a Level I subject are sometimes re-tested on an evening when students studying the subject at Level II are being assessed. The problem of student failure has been felt particularly acutely by some staff because of the range of students on the programme. Students who would previously have joined the ONC course are found in the same group as students who arrived with CSE or craft qualifications'.

FEU Commentary

Where such distinctions can be made, questions about the number of re-sits to be held, the mark to be credited and the aggregation of marks might be answered more rationally. Where tests are to measure competence, clearly minimum acceptable standards must be reached.

It is suggested in further development work consideration is given to the use of literal grades (A, B, C, D etc) derived from numerical marks where necessary. Decisions about grades of Pass or Pass-with-Merit could then be based on a profile of performance and avoid aggregation of component marks which engender time consuming and sometimes not very meaningful calculations.

240. Some colleges reported the need to ensure the system of assessment does not allow students to take improper advantage. For example:

'Re-testing is now well recognised as a problem area, even TEC have acknowledged it. All sorts of remedies have been tried and most have serious disadvantages. We have adopted a policy of keeping re-tests to an absolute minimum consistent with the students' interests. When we do re-test we frequently include a penalty. It is a fairly harsh penalty for the absentees (unless a doctor's certificate is produced). This is to deter those who otherwise deliberately avoid the initial test, and with the tight constraints of specific objectives, would gain a considerable advantage. In some instances a continuing good record is sufficient to be credited with the assessment which was failed, in others some additional homework is set. Each case is dealt with on its own merits. In cases of dispute the programme co-ordinator arbitrates.'

'There are a minority of students who are much more intent on "playing the system" than making a sincere attempt at each of the assessments. Any experienced practitioner will be familiar with these characters. We initially underestimated their guile and found people who would deliberately miss the assessments to gain advantage from a re-test covering the same objectives. We have also had a few instances of cheating. These are reported to the moderator and have resulted in one student being referred' (College F).

Assessment: avoiding abuse

It appears that teachers have found it necessary to take steps to ensure students do not abuse the assessment procedures which provide opportunity to re-sit phase-tests. Those students who absent themselves from a test when they perceive an opportunity to take a similar test on a later occasion may do so because they need more time to assimilate and learn the course content as well as for any belief that unintended advantages may be gained.

241. *'Stated in the submission document is the policy (recommended by the college TEC Examinations Committee) that if a student misses a phase test or other in-course assessment through absence, one of two actions should be taken: (a) an individual assessment test shall be given (b) where the student's general attitude and performance in the programme is shown to be satisfactory he/she may be awarded an estimated test mark based on his programme (not unit) coursework. The action may only be taken with the consent of the department's Programme Co-ordinator'.*

'To a large extent the policy was adhered to in 1978-79, the first year of programme operation. A number of staff, according to one lecturer, interpreted paragraph (b) rather loosely and used their own judgement as to whether absent students should take a test on their return. At the July meeting, staff were reminded that "referred tests" should be given. In practice, a referred test often requires the students to be placed in a separate room for the test under the supervision of any member of staff who happens to be available. Discussion of test results with the group is delayed until all students have taken the test, creating sometimes a break of several weeks between test and subsequent comment. On occasion, staff have doubted the legitimacy of certain absences, and there is now a policy, not always followed, that the absence of any student from a test should be reported to the employer' (College N).

Unco-ordinated development

The introduction of TEC programmes appears generally to be characterised by college departments pursuing the development work individually rather than collectively. This reflects the strong boundaries between departments in many colleges and the fact that TEC programmes may be only a fraction of their total curriculum provision.

242. In the light of early experience of running TEC programmes some colleges have found it necessary to set up committees to establish policy and co-ordinate practices across the college. For example:

'at the July 1979 seminar on problems of TEC assessment and administration it became clear that practice in the college varied widely from programme to programme, and this realisation may have contributed to the decision to establish a new sub-committee of the Academic Board, for admissions and awards' (College N).

FEU Commentary

Factors helping the development process

In responding to the requirements of the new curriculum validating body, TEC, teachers in colleges have found much benefit from external contacts, meetings and working groups. Existing social organisation by its very nature is conservative and protective (Havelock, 1973). By joining new external groups teachers can overcome their uncertainty, gain confidence and use their membership to influence their colleagues in making the changes which are required. Meetings can also help to engender trust and respect among those involved and the colleges which they represent. Collaboration can enhance motivation.

The slowness of response by TEC to college queries of which teachers were critical, reflects the overload on the TEC organisation particularly in the early years of development. The extent of the talks and visits by senior TEC officers illustrates the lack of manpower available centrally for this major curriculum change.

The innovation process is facilitated by the support of external agents who can mediate between the centre and the colleges. TEC Advisory Officers were able to play a key role in this respect in so far as their time allowed. Teachers have generally found personal contact, by telephone or at conferences beneficial and rewarding. Face to face contact removes uncertainty. The central base of the Advisory Officers and their close working with programme validation groups means they are identified by teachers developing programmes in colleges as being able to advise on practice which is likely to be acceptable to the validating groups. Care must be taken that this central function does not lead to the inappropriate adoption of central solutions to local problems.

Factors helping and hindering the development process

Factors helping the development process

243. Factors helping the development of courses in some colleges can be classified as those arising externally through consultation with others, and those emanating within the college.

244. **External consultation with others.** In responding to the requirements of a new curriculum validating body, colleges have found much benefit from external contacts, meetings and working groups. Thus examples have been observed of the value of inter-college study groups to share experience of the meeting of Regional Groups to interpret TEC circulars (note for example the Technician Advisory Groups of the Yorkshire and Humberside Regional Advisory Council), of meetings with staff of other colleges to solve specific problems (eg how to develop an appropriate record system). Those colleges involved in joint-submissions have found the meetings beneficial in overcoming the isolation of individuals, providing opportunity not only for discussing the immediate task but also pedagogical issues. Staff responsible for developments in colleges not involved in joint-submissions found benefit and mutual support from existing contacts with fellow professionals. For example a programme co-ordinator believed the most important source of moral and material support was the inter-college Construction study group . . . the principal advantage of these meetings are that they provide a forum for lively debate on the many aspects of the submissions . . . (they) were invaluable because they provided a basis for confidence in decisions which would otherwise have been taken in isolation (College F).

245. Whilst during the introduction of A5, B2 and C1 programmes staff in colleges have criticised TEC for slowness in response to their queries, many staff found personal contact with Advisory Officers and moderators to be generally very helpful. In the early period of developments, say prior to 1977, there were few Advisory Officers and before validation of the college programme no moderator for the college to contact.

246. During this period the senior officers of TEC made a remarkable number of visits to local and regional conferences and to colleges to explain TEC policies. They emphasised the opportunity for colleges to design programmes appropriate to the needs of industry and students in their locality. The extent of their own visiting illustrates the lack of manpower available centrally for this major curriculum change.

247. Staff have found that Advisory Officers are often a source of valued information as to what course of action by the college is likely to be accepted by a Programme Committee. Where, initially, colleges experienced difficulty in understanding and meeting the demands of TEC through its programme committees, visits by teachers to meet TEC officers helped, through the opportunity for face-to-face discussion, to solve a problem or perhaps 'dispel lingering mystique'.

In some cases staff of colleges gained confidence from their contact with industry when they felt the programme proposals were acceptable to employers. However experiences of consultation with industry seem very diverse both in practice and in recollection, and are discussed elsewhere (paragraphs 153-158).

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Innovation is facilitated by efficient information flow within an organisation and mechanisms for institutional problem solving.

Innovation is facilitated where teachers have a clear understanding of the rationale for change and opportunities for developing new skills.

A principal factor which motivates many teachers appears to be their concern to do their best for their students.

The provision of Standard units enabled some colleges to gain validation of programmes at an earlier date than would otherwise have been possible.

It is interesting to note teachers' responses to open-ended questions seeking their opinion about factors which have most helped (or hindered) the development and implementation of TEC programmes. Although some two-thirds responded, very few refer to strategies of any kind which may have been developed to facilitate the change. Similarly, few responses mention possible conflicts in the process of change, eg power-conflicts. Although teachers identified who undertook most of the development work (paragraphs 183-184) they did not refer to factors concerning the management of the process or interpersonal dimension of change. It is suggested that in general teachers do not appreciate that the process of curriculum change is as much concerned with achieving satisfactory relationships between teachers and developing their understanding and

248. **Internal communication in colleges.** Some colleges have benefited from the use of existing networks to disseminate TEC circulars and correspondence to all staff involved with the programmes, or they purposely established a college TEC committee or member of staff responsible for keeping staff informed. It is the case however that in many colleges, particularly in the development phase, there was a lack of such helpful communication. The benefit of good communication across departments in a college has been observed when one department can learn from the experience of another at a later stage of development. However, developments in one department may not necessarily be seen as helpful by another.

249. **Previous experience of staff and staff training.** Where the majority of staff in a department had previously learnt to write objectives or had been responsible for devising their own assessment methods this proved advantageous (eg College H). Previous training in writing objectives had not always convinced staff of their value, however. Staff spoke of the value of conferences and study groups specifically arranged to assist their understanding of the requirements of the new approach, but our data shows that relatively few of those teaching the new courses had such experience. A particular effort to involve as many teachers in introductory study conferences as possible had been made in the case of the joint-submission in which an LEA Further Education Officer had a significant involvement in the development. Allocation of resources to this activity appears to have been much appreciated by those who took part. This is not characteristic of all joint-submissions, and in any event a continuing programme of staff training is rare.

250. **Personal commitment of teachers and contact with others.** In the opinion of college staff at all levels the factor which above all others they believe has helped the development of programmes is the willingness of teachers to work hard, with dedication, interest and enthusiasm (42% of all respondents drew attention to this. Table 32). In a similar vein some wrote specifically about the co-operation between staff. The next most frequently occurring responses refer to the 'appointment of moderators, and their role at the college'. Whilst some staff have drawn attention to differences in the approach and abilities of different moderators, they are generally a most welcomed part of the system. In some colleges they have provided the only

Table 32 *Factors which have most helped the development of TEC programmes*

Categories of teachers' perceptions	% of teachers responding to this question who expressed this view*
Willingness of staff to do additional work, hard work, dedication, interest, enthusiasm of staff	38
Co-operation of staff	16
Provision of Standard units, standard objectives, guidelines from TEC	10
Phasing out of the old courses	6
Appointment of moderators, attitudes of moderators, meetings with moderators	4
Introduction of the specific objectives format	4
Co-operation or liaison with industry	4
None	4
Miscellaneous responses (see Part 2D)	30

* Of the total respondents to the questionnaire [N=362], 32% did not respond to this open-ended question.

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skills, as it is concerned with defining curriculum content and establishing new assessment procedures.

Factors hindering development

Resistance to change is well known. People generally prefer the familiar to the unfamiliar. Innovations imply changes in values and value conflicts are a significant barrier to change.

Various studies have illustrated the problems of communication between national curriculum bodies and colleges or schools. Thus 'poor communications' were cited as bearing some responsibility for Schools Council projects not having as much impact as they should (Steadman et al, 1980). In fact if three in every four teachers receive in some way or other TEC printed materials as implied by the FEU Project Report No. 3, then this is certainly a considerable achievement. TEC have identified that they have not had sufficient resources to enable a massive distribution of circulars, and hope 'that colleges will be able to act as information centres for industrial enquiries on points of detail' (TEC News No. 2, July 1975).

'human-face' of TEC and have been seen by many staff as a real link with an otherwise distant national centre, there being no local or regional representation of TEC.

251. **Other factors.** A substantial number of respondents also identified the provision of Standard units and guidelines from TEC as being helpful to the development.

Factors hindering the development process

252. Factors which hindered the process of development centre on four themes: a resistance to change by many teachers who felt the former provision to be satisfactory, poor communication either within a college, or with external bodies, in this case particularly TEC, inadequate time and resources, and inadequate staff development and training (see Table 33).

253. **Reluctance to change from the past provision.** Many teachers spoke with industry on the adequacy and standards of the former City and Guilds and National Certificate courses which were to be replaced. Staff commented that employers had not expressed dissatisfaction with the former courses, with the exception of the area of General Studies. Thus although little systematic evaluation had been carried out, many teachers felt there was no need for a major change on the scale proposed by TEC. The proposal to replace the well established courses by new and untried TEC programmes engendered a climate of uncertainty and apprehension.

254. **Communication.** One of the more frequently identified barriers to development was communication problems of various forms, both between the college and TEC and within the college. (An FEU commissioned study on Curriculum Dissemination in Further and Higher Education suggests that about 24% of those teaching on courses validated by TEC and BEC do not

Table 33 *Factors which have most hindered the development of TEC programmes*

Categories of teachers' perceptions	% of teachers responding to this question who expressed this view*
Lack of guidance, insufficient information, communication problems, including jargon (mainly critical of TEC)	14
Over complex, cumbersome administrative procedures, validation procedures	12
Lack of time for preparation and/or testing	11
Lack of time for development work, rush, inadequate research	11
Too much paperwork	9
Assessment problems, too much testing, too rigid adherence to assessment specifications courses	8
No time allowance for increased work	7
Lack of resources	7
Too much administrative work, too many committees	5
Late provision of Standard units, lack of Standard units	5
Failure to provide a standard programme – lack of direction from TEC	4
Miscellaneous responses (see Part 2D)	26

* Of the total respondents to the questionnaire [N=362], 24% did not respond to this open-ended question.

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There is no doubt that support for curriculum change needs to take the form as far as possible of personal contacts, consultancy provision and workshop activities if teachers are to be able to effectively implement new curricula.

In general, more use of the media (local advertising, radio and TV) is required in order to achieve greater awareness of impending change.

The term jargon is applied contemptuously to language which is unfamiliar to or not understood by the receivers. Whilst teachers' reference to the jargon of TEC documents is, in part, an indication of their resistance to change, it further illustrates the need for consultancy support and workshops to accompany the circulation of printed materials. Where such support cannot be provided, the disseminator should attempt to minimise the use of unfamiliar terminology. The geographical separation of staff workrooms can give rise to relationship difficulties and communication patterns which are barriers to innovation. This is a problem for college management to tackle. In a large department in which TEC programmes are only a fraction of the total curriculum provision it is perhaps not surprising if junior staff are not aware of the development work of their senior colleagues. However communication between staff either through the mechanisms of newsletters, meetings or course-teams should ensure such problems are overcome.

The lack of resources for development work have limited the creativity of some of the colleges. Combined with the pressures to gain successful validation within a prescribed time-scale adoption of Standard units is often inevitable. Innovation takes time (Nisbet, 1975).

The lack of pilot schemes was a principal methodological weakness in the development of TEC programmes. The absence of information about pilot schemes was particularly

receive printed materials issued by the Councils – FEU Project Report No. 3, 1980.) Some teachers, during visits of the evaluation team to colleges, expressed the view that TEC had not provided sufficient information and guidance to help them with the introduction of programmes.

255. A member of the evaluation team reported in a study of developments at one college 'that the lack of effective communication between TEC and the college caused uncertainty in many areas. A lack of information and a slow/no response from TEC was seen as being the main problem in the initial stages . . . the use of regional bodies was seen as a positive need for the easing of communication barriers . . . there has been no advance warning from TEC of impending changes, there is a greater need for forward planning with due notification of impending changes . . . Teachers expressed opinion that more publicity from TEC should have been given to industry' (College K). 'Many instances were described of embarrassingly slow responses to urgent requests from colleges'.

256. In a study on Curriculum Control, commissioned by FEU, Heads of Departments indicated that whilst information and documentation received from TEC was useful, it had frequently arrived 'too late for maximum use'. They found it to contain 'too much jargon' (FEU Project Report No. 8, 1981). Teachers responding in this enquiry also found TEC documents difficult to interpret. In some cases TEC Circulars and Guidance Notes may be sent to the Principal of a college or other senior member but may not be widely circulated to staff. In one college, material was filed in a departmental office by the Head of Department without circulation. In the same department the Head was the only person to go to external conferences about TEC.

257. Barriers to communication also take the form, in some colleges, of separate staff work-rooms for the more senior and junior staff. In one college visited, the junior staff teaching the TEC programme were not aware of the consultation with industry made by senior staff.

258. **Insufficient time and resources for development work.** In a number of colleges teachers identified a slowness of response by TEC to fulfil their needs and expectations. In particular, colleges felt Standard units should have been available at an earlier date. In many cases, work had been undertaken on college-devised units in an atmosphere of uncertainty as to when Standard units would be available. It is interesting to note that as soon as the 'equivalent' Standard units became available they were frequently adopted in preference to the college units. Those with responsibility of making the submission for validation welcomed the Standard units.

Many staff believe that the development was carried out in too much of a rush and criticise TEC for not setting up and monitoring some pilot schemes in a few colleges before establishing the programme which encouraged responses from all colleges.

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disturbing to engineers, builders and scientists accustomed to trial of a new process or product before universal adoption.

TEC's commitment to separate programme committees with considerable autonomy of operation is reflected in the nature of both single and inter-college programme development. Colleges did not have sufficient resources and experience, generally to do other than develop programmes for different technician fields independently of each other. In further programme review and development, commonality of similar units should be sought wherever possible. In submissions to programme committees, colleges should add notes to accompany their identification of common units (Val III: iv) to indicate where approval has already been granted by another programme committee.

The preferred curriculum requirement of TEC that objectives should be specified, and detailed assessment plans provided, caused teachers to attempt new practices often without preparatory training in the necessary skills. Previous studies of curriculum change have also highlighted the inadequacy of staff development. Thus, the evaluation by Dr. Kaneti Barry (1974) of the '500 Basic Engineering Craft Studies' identifies that 'the introduction of the new syllabus . . . should include some instruction on communications and management to avoid bottlenecks in the dissemination of information and its percolation, and thus create a better atmosphere for experimentation, change and innovation'. Whilst many teachers of TEC programmes appear to have been generally more aware of the contents of the new syllabus than were some teachers of the Craft Studies course, some of the difficulties might have been avoided if guidance from pilot-scale trial implementation had been available.

259. In joint collaborative college developments it appears to have been common to separate programme development groups (for example for A3 and A5 programmes) to design different assessment plans for the same Standard unit. In both the commissioned reports of County submissions, this was true for a number of units. Consequently problems had arisen when a teacher found himself teaching the same unit to more than one group of students registered on different programmes, and more particularly to a single group of students from different programmes. A similar kind of experience which caused discontent in some instances, was when staff observed that a General and Communication Studies unit was found to be acceptable to one TEC Programme Validating Group but not to another.

260. Where formal allocation of time for curriculum development is not made, staff feel some priority to looking after the needs of students on existing courses. This is particularly true in the case of departments which have large numbers of students on courses other than technician courses (eg departments with large A level groups).

261. **Insufficient staff training and development.** Many staff who were involved in writing objectives found the process difficult. Clearly there was, in some cases, inadequate experience and understanding to tackle the job – leading to statements such as *'it's a game'* or *'just a matter of changing words'*.

Similarly, completing assessment specifications and plans with details of the methods to be chosen to assess different skills and the percentages to be assigned to different skill categories, was found to be a difficult exercise. Although some staff attempted the task with meticulous care, others say they undertook the exercise with *'tongue in cheek'*.

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Moderation

The key role of the moderator is clearly outlined in TEC Circular 13/75. It is unfortunate that further guidance for the moderator on making visits to colleges and on the duties involved, was not formally available until the 'Handbook for Part-time Moderators' was issued in the autumn of 1979. With only two full-time moderators appointed in 1977, until the increase to ten in 1980, the part-time moderators advised colleges on the basis of their own experiences rather than on a common understanding of TEC policy. A more systematic training of moderators in the earlier years of the introduction of programmes could have done much to enhance the credibility of provision. It appears that no time or resources could be allocated to such functions, the priority being to validate the new programmes within a rapid time scale. The relative lack of operational guidance to moderators and teachers of programmes provided by TEC, contrasts, for example, with the meetings and guidance papers prepared for part-time counsellors and tutors (who fulfilled the role of examiners) of the Open University from its inception.

The divergent views on the amount of moderation necessary can be reconciled perhaps in terms of the degree to which a college feels the need for external criteria to validate the standard of its courses. The general appreciation of the moderator as an external agent linking the college into a national TEC system suggests that the total time given to moderation should not be reduced. Whether this time is allocated to two or three visits by the moderator to a college in a year should depend upon the particular circumstances.

Teachers tended to respect most, the moderators' competence as a subject specialist. Their previous concept of the role of moderator caused them to doubt whether the moderator could make appropriate judgement in the case of units whose subject matter was outside his own direct experience. However,

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Moderation

262. In Circular TEC 13/75 TEC expanded its policy on the 'Role of the External Moderator'. Twenty-seven part-time moderators were appointed during the 1976-77 academic session and the first full-time moderator took appointment on 1 April 1977. By the end of 1980 about 400 part-time and ten full-time moderators had been appointed. External moderators should play 'a key role in establishing and maintaining the standards of the Council's awards by monitoring the operation of TEC programmes and assessment arrangements'. The duties of the part-time moderators were amplified in Appendix III of the TEC 'Handbook for Part-time Moderators, 1979-80'. This handbook was the first formal guidance provided although Circular TEC 13/75 and the External Moderators' Report Form gave an overview of their general responsibilities. The handbook was first available in the autumn of 1979, and was distributed at regional meetings of part-time moderators. It was much welcomed by them.

263. **College experience.** Colleges have welcomed the link they feel the moderator makes between themselves and TEC. However on visits of the evaluation team, colleges expressed reservations about the moderation system. Two matters re-occurred in a number of situations; firstly the breadth of the role of the moderator, and secondly the nature of the expertise required.

264. It is clear that the demands of the moderator's job in a new developing provision can be quite severe, particularly in cases of programmes which enrol large student numbers (eg 250). There were suggestions that either the role should be limited, or more resources devoted to it so that a moderator could get to know better the staff and students of a college. A Head of Department (who was not a moderator) felt a very much increased fee was necessary if the moderation function was to be properly undertaken and by highly experienced and qualified personnel. Some moderators themselves, although enthusiastic about the work, were conscious of their relatively low fee. *'We reckon last session that the payment worked out at less than £1/hour'.*

265. Doubts also arose in the minds of teachers about the validity of the present system because some of their preconceptions of moderation were not being met. For example, they doubted whether a moderator could make valid commentary about parts of the programme in which he does not have specialist subject expertise.

They also doubted whether a part-time moderator who visits only three or four colleges can assure them of the standards of their courses in relation to a national provision.

266. The following report of the experience associated with the first year of a Science Programme illustrates the tentative start to the new system of moderation of technician courses, and teachers' reservations about its feasibility.

'The moderator for the Science Programme was appointed late in the academic year 1978-79 and he made only two visits to the college. Some anxiety was commonly experienced before the first visit, but it was "less traumatic than expected" in the view of one lecturer. For the visit at the end of

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the principal function of the moderator is to monitor the assessment procedures for the programme as a whole and to ensure the college is implementing the programme as validated. Few moderators will be expert in all subject areas.

Since the moderator is also concerned with level of achievement it would seem necessary for TEC to continue to develop an information network and cross-moderation function both regionally and nationally, calling upon data of students' performance now building up at the TEC centre. Publication of such data, but without identifying colleges since the context of individual programmes varies greatly, could contribute to giving assurances to teachers, employers and others that the moderation process can identify changes which might be needed at a particular college in order that the implementation of the validated curriculum results in an appropriate standard of achievement.

The programme moderator appointed by TEC is perceived by teachers as perhaps the most significant link between the college and TEC. It is important, therefore, that the teachers should have access to the moderator and that the moderator meets if not all the staff teaching the programme, then as many as possible. Wherever possible, provision should be made for all teachers who have taught or counselled any of the students to attend the meetings at which decisions are made regarding the grades to be awarded. In practice, where a college operates many programmes and student numbers are large, this may not always be practicable.

The comments made by moderators at regional meetings convened by TEC, illustrated the need for more resources to be available for their training and development, in order to develop a more uniform interpretation and development of TEC policy and practice.

In view of the defined key role of moderators it would seem essential that they receive direct from TEC a

the year the in-course assessment tests for each unit, a cross-section of practical books, marked scripts and mark lists were made available, and the moderator discussed results and procedures with Group Tutors and senior staff. Not all the Section Heads meet the moderator at each visit, but the Head of Department usually asks them to list any issues that should be raised.

'Only a few of the Science staff who were interviewed had much respect for the new system of moderation. One thought the system "sensible" and the moderator himself "understanding, sympathetic, realistic". A senior member of staff believed that the moderator was doing the job well by checking to see if the programme was being run as it should be and generally helping the department to understand TEC requirements. "A congenial SS man" was the description given, and impending visits had been discovered to provide useful levers in extracting necessary pieces of administrative work from certain members of the department. However, he believed that the role was inappropriate: how could a specialist in a single subject discipline, moderate a programme which drew upon at least four?

'The need for subject assessors rather than a moderator was emphasised by all the interviewees. (The ONC term "assessor" was frequently used by Science staff when they meant "moderator".) The moderator's access to subject specialists in his own college was felt to be an inadequate guarantee of authority. If the moderator failed to comment on test papers, the doubts of staff were confirmed; any comments that were made were frequently judged "silly" or "ignorant". Suggestions made by the moderator at his first visit that multiple re-sits and remedial work should be considered did not help to change staff expectations of the system. Several lecturers shared the opinion of one member of staff who wished to see subject assessors restored "not for personal reasons but for the certificate's national standing".'

267. Visits to colleges indicated that many of the teaching staff had not met the programme moderator. About half the respondents to the questionnaire had attended meetings of a group of staff with the moderator to discuss the grades to be awarded to students – about one-third attended regularly and the remainder occasionally – but half had not attended. Of the Lecturer Is replying, 25% had attended such meetings. A majority (80%) of those involved indicated that at such meetings decisions were made 'by the group of staff with the TEC moderators' guidance', rather than by the moderators themselves (14%) or by individual teachers (6%).

268. **Moderators' experience.** The evidence below was obtained largely from an opportunity to attend a series of 'one day' regional meetings in 1979 of part-time moderators who already had a year or more of TEC moderation experience. Moderators are required to make three visits to a college per annum. They report no serious problems in making arrangements provided a degree of flexibility is possible. 'Occasionally (there are) problems with Group Schemes where three visits are not necessarily enough'. Given the opportunity to ask questions of the full-time TEC moderators and TEC Advisory Officers, the more commonly occurring issues raised by part-time moderators were:

a. problems of communication between TEC and themselves;
b. the role and duties of the moderator;

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copy of the validated programme and subsequent validated amendments rather than leave the responsibility to the college to update them.

As experience of the operation of TEC programmes develops, mechanisms of college self moderation or monitoring of programmes should be encouraged. Since part-time TEC moderators are typically full-time employees within the further education colleges, in further development their own experience could be used in local programme moderation as part of the on-going process of curriculum review and development. Where colleges can demonstrate their own satisfactory mechanisms for evaluating their curriculum, a TEC appointed moderator might only need to visit the college once each year.

Aspects overlooked in programme design

The problems arising are attributed to both the haste with which the initial Standard units and college programmes were produced, and the self-contained nature of the units. Teachers' comments provide further evidence of the consequences of focusing unit design on the ends to be achieved with little consideration for the likely learning difficulties and appropriate experiences. At the design stage more attention should be given to the learning implications, since in practice the objectives and assessment plan require teachers to implement the unit in its totality. At the implementation stage, programme organisation needs to take greater account of the

c. the problems of retesting students who had failed to obtain a satisfactory performance on 'phase-tests';

d. the process of moderation in relation to the award of Merit and Pass grades.

269. **Communication.** Problems of communication between moderators and TEC were illustrated by requests for up-dated information, requests for direct receipt of amendments approved by TEC for a college programme, requests for information as to the extent TEC had informed the colleges of the authority of the moderator. Both favourable remarks: eg *'how pleased I am to receive the handbook', 'there is a publication on levels which is a reinterpretation and helpful'*, and unfavourable remarks, eg *'letters to TEC are not replied to', 'I was answered by Mr. ——— that you will receive copies of all matters – just a myth – I find this an embarrassment'.* Moderators asked for a more systematic and reliable communication to part-time moderators on all matters concerning the validated programmes for which they have responsibility.

270. **Role of the moderator.** Moderators showed alternative conceptions of their role. Some saw this primarily *'to look at assessment'* in terms of objectives, others primarily *'to look at border-line cases'.* The problem of fitting in the role with a full-time job was mentioned. Concern was expressed that *'a moderator could be going through a charade – in areas where the college recognises that he is not a subject expert'.*

271. **Assessment, retesting and grades to be awarded.** Moderators revealed that a diversity of practice with regard to the policy and logistics of allowing student resit examinations was occurring. Guidance was sought as to which resits should be allowed. *'Some colleges have had a rigid statement. . . . I have one college doing what it did not say in the submission, they have two retrieval times' . . . 'We have five assessment points and will let him resit two.'* It was suggested that the resource constraints on colleges are limiting the extent to which retesting is occurring.

272. Closely aligned to the alternative views and practices about retesting are concerns about the awarding of pass and merit grades. Whether students who initially fail a phase test should then be able to get a merit is a much debated area. One moderator said he had agreed with the college that they would get the minimum grade of pass. Others argued for a more flexible approach.

Oversight in programme design: changes made on implementation or required

The following evidence of teacher opinion (paragraphs 273-281) was obtained from visits to colleges and responses to open-ended questions of the questionnaire (Part 2D).

Aspects overlooked in programme design – teachers' opinion

273. In the light of their experience of teaching the new TEC programmes teachers identified a number of issues which appear to have been overlooked or which received inadequate attention during the stages of development of programmes. The issues centred around three themes: a. the assessment of learning, b. unit content and student learning, c. organisational and resource demands (Table 34).

274. **The assessment of learning.** Teachers have found the number of assessment points in many of the units excessive in number. Problems in the reassessment of students generally appear not to have been anticipated (paragraphs 237-240). Some teachers indicated their belief that there had been inadequate concern to maintain the standards which they associated with the existing courses.

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need to accommodate the differing learning rates of students. The Haslegrave report identified the need for a greater time allocation to permit effective learning through for example additional practical work, especially for slower students (Haslegrave Report paragraph 126).

Much of the most time-demanding work of curriculum development occurs at the implementation stage, not surprisingly since this is close to the real curriculum in action. This is particularly so if the analysis and design stages have been rushed, as was the case in the development of many of the TEC programmes.

TEC has responded to the pressure to reduce the assessment demands to those which teachers have found to be more manageable in their interpretation and implementation of the units. Typically this means three or at the most four assessment points per unit rather than the often more ambitious intentions documented in submissions and validated by TEC programme committees. It seems clear that both TEC and the colleges were unable to anticipate the organisational difficulties which would arise from many of the assessment plans, particularly in relation to the requirements of students to re-sit assessment tests during the course of study.

275. **The unit content and student learning.** Issues of particular concern relate to the unit structure of programmes. Teachers expressed their concern about the overlap and the lack of integration between the content of units, and with lack of continuity between levels. Staff perceived that the 'content' and 'the amount of work' involved in some units was too large in relation to their design length of 60 hours. Similar concerns were expressed by some teachers in terms of a lack of time for students to absorb the level or quantity of the material. Individual teachers pointed out the need to cater for both the students who were less able and learnt at a slower pace, and also the more able.

276. **The organisation of teaching and learning.** In the opinion of teachers other aspects overlooked in the analysis and design phase were: the increase in workload for teachers, especially administrative tasks (see eg paragraph 208), the amount of time needed for the development of teaching, learning, and assessment methods, the lack of resources and costs required for effective implementation.

***Table 34** Teachers' comments about aspects overlooked in programme design, changes which have been and which should be made*

Issue	Aspects overlooked in programme design	Changes which have been made to content and organisation	Changes which should be made to content and organisation
Assessment processes	the amount and administrative burden of assessment;* problems in reassessment; need for standards (eg national examinations)	adjustment to assessment plans, reduction in number of tests*	reduction in number and duration of phase tests;* external papers set by TEC or regional body;* more emphasis on end tests
Unit content and student learning	unit content too great, overlap and fragmentation between units;* time needed for student to absorb the level and amount of material*	changes in unit content and emphasis to provide continuity;* redesign of certain units (especially drawing and design)	reduction of unit content and level of content;* integration of unit content; review of objectives and programme as a whole*
Organisational and Resource demands	increase in staff workload and administration;* time needed for programme development and development of teaching, learning and assessment methods		reduction in the number of units;* reduction in administrative and paper work
Teachers replying:	none or very little, 2% not responding, 24%	none or very little, 45% not responding, 17%	none or very minor, 3% not responding, 32%

* More frequently occurring responses.

Changes which teachers have made

The principal changes have been to simplify the assessment processes from the intentions of the design stage. Teachers vary in their perception of the extent of change which is legitimate without seeking formal approval from TEC or the moderator. The 'gatekeeper' role of the senior staff between TEC policy and individual teachers could be

Changes which teachers have made to programme content and organisation in the light of experience

277. Just over half of the teachers who identified that various aspects had been overlooked in programme development indicated that changes had been made at this relatively early stage. About half of these teachers indicated that adjustments had been made to assessment plans, usually a reduction in the number of assessment points (Table 34).

For example in one of the case study colleges 'revised assessment plans for thirty-two of the fifty units in the programme were submitted to TEC in June 1979. Most contained a smaller number of in-course assessments while retaining the terminal test. One lecturer interviewed saw the change as an

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detected in some situations. Whereas some self-assured teachers felt able to make substantial amendments without formal approval others believed approval is necessary for minor changes.

Some senior staff may use the argument that changes would require external approval to deter their colleagues, either in the belief that the initial submission should be given a good trial before change, or to avoid the additional administrative work, which would be involved.

There is much scope for the application of microcomputers in the management of assessment (Guggenheim and Lazenby, 1980).

unfortunate regression to the ONC pattern. Despite the modifications, many staff in 1979-80 still interpreted the plans with considerable freedom – eg "I distort the assessment plan, but it's still an honest judgement, still moral and ethical" – while others hardly referred to them at all' (College N).

Some teachers indicated measures of stricter control to ensure that students 'don't play the system'.

278. The other major area of change which teachers reported was in the content of the units. These mainly referred to a reduction in the amount, with an understanding by some, but not all teachers that up to about a 10% modification is legitimate without seeking formal revalidation as an amended unit. A number of subject areas where substantial changes to unit content have been required and made were identified although the study has not been concerned or able to examine the appropriateness in subject-matter terms of individual units. In particular, changes to Standard units in Engineering Drawing and Design and Mathematics were reported and to college-devised General and Communication Studies units.

279. The following critical commentary exemplifies the need for change expressed by teachers of Engineering and Design: 'The introduction by TEC of elements of design within their Certificate level Standard units again suggests that little thought had been given to the recipient's age and industrial experience. Much of the work outlined is traditional HNC and post HNC material. To a 16-year-old first-year apprentice the relevance of the duties and responsibilities of a Chief Designer, a product's aesthetics and saleability features together with design feasibility studies is incompatible with his standard of basic engineering technology and lack of skill in general draughtsmanship and workshop activities.' This extract is from a paper which provides a valuable taxonomy for the graphic communication curriculum (Davies, 1980).

280. Reports have been received of the usefulness of the TEC Mathematics Bank of Objectives (TEC U78/911), developed following the earlier Standard units, in the reorganisation of objectives in Mathematics units.

Changes which teachers believe should be made to programme content and organisation

281. Many of the comments made by teachers about changes to the content and organisation of programmes and units which they believe necessary are concerned with reducing the demands of the new curriculum organisation (Table 34, page 104). Thus teachers believe there should be a reduction in the amount, both in number and in time spent, of phase tests, a reduction in the content of units, a reduction in the administrative and paper work. Some teachers expressed a wish to see external papers set by TEC or a regional body, others would like the accumulation of marks for course work or class tests including laboratory work to be less formal. Whilst requests for changes to the assessment process occurred most frequently, teachers also expressed their concern that programme development should look at 'planning the programme as a whole', 'reviewing the objectives of the programme', and the 'integration of unit content', and 'links between units', avoiding overlap between units and ensuring 'vertical continuity' where appropriate. Some teachers believed more emphasis should be put on students acquiring skills and on the more practical aspects of programmes. Individual teachers who responded expressed either the need for more or less options, depending presumably among other factors on the particular programme to which they referred. More commonality between A2, A3 and A5 programmes (Diploma) was suggested where 'industry does not decide what trade apprentice(s) will pursue until they have spent a certain time in each section'.

FEU Commentary

Other review and formative evaluation

Formative evaluation is an essential part of curriculum development. It is surprising therefore that TEC did not identify a role for an evaluator from the initial establishment of policy. Many curriculum development projects, pre-dating TEC in the schools sector, specifically built in such evaluation. TEC's limited resources may have contributed to neglect of this area. However, TEC and its officers have been responsive to many of the major changes required by the colleges on the basis of operating the newly validated programmes.

The role of evaluation, as part of the process of programme development, to describe the consequences of the analysis, design and implementation processes in the development of programmes both centrally, by TEC, and in the colleges is an essential part of curriculum development. Practice and policy can be modified accordingly. It should be distinguished from research into new kinds of programmes to meet new technicians' needs and skills, but just as important. Without evaluation there can be no curriculum developments.

282. The programme co-ordinator of a Science programme writes: *'Staff now have the experience of teaching most of the units and opinion is that a number of them need re-writing and among the criticisms levelled at these are that they:*

i. are superficial and try to cover too much with little time allowed to explain and develop important ideas and concepts;
ii. lack continuity and sometimes present objectives in isolation;
iii. have too ambitious and complicated assessment plans and specifications.

The latter point has prompted the not unique comment that the emphasis has switched from teaching/learning to assessment with phase tests as an almost weekly routine for students and their preparation as a regular "pastime" for staff'.

Other review and formative evaluation

By the Technician Education Council

283. TEC did not establish a formal evaluation programme or methodology as part of its initial policy and development work. However it did respond to the problems experienced by the colleges, firstly by reducing the 'paperwork' required in submitting programmes for validation in 1976-77 following the 1976 starts. Two working parties of the Education Committee were set up early in 1978 in an attempt to overcome some of the difficulties, these were the Assessment and External Moderation Working Party and the Documentation Working Party. The task of the Assessment and External Moderation Working Party was 'to prepare guidance for colleges on assessment and to ensure that the system of external moderation is as thorough as possible in establishing and maintaining standards'. The task of the Documentation Working Party has been 'to simplify the paperwork used both by the colleges and TEC'. The work of these groups, led, amongst other things, to the issuing to colleges in July 1979 of further Guidance Notes (No 8) on assessment, and in May 1979 of the TEC 'Handbook of Procedures' for the administration and operation of programmes.

284. In late 1977 TEC established a Research Sub-Committee which identified at its early meetings, the need for evaluation studies and to support or co-operate in several projects. More recently TEC has formed a Research, Development and Monitoring Section led by a senior Advisory Officer. Its initial work is concerned with monitoring, the student numbers entering specific programmes, the distribution of grades achieved by students of specific units and programmes and comparability between colleges, the relationship between entry qualifications and subsequent performance, student success rates, and colleges' approaches to assessment. Assessment papers prepared and used by colleges for selected units have been collected and appraised, and this work continues.

285. Other recent responses by TEC to ease the administrative and organisational aspects of the implementation of programmes include the redesign of Student Unit Report forms for recording and reporting student grades, the introduction of a single instalment for all new registration fees, and the development of external assessment material. A TEC working party on Laboratory/Workshop exercises, set up following evidence from this and other studies led to TEC Circular Letter, TCL/80, announcing concern at the apparent diminution of the amount of practical work (laboratory and workshop exercises) and the intention to survey college practice in relation to specific units by asking Moderators, Programme Committee Members and TEC Officers to report on examples of good practice.

286. TEC is currently (1981) reviewing and revising its policies in preparing a new Policy Statement. TEC is looking at such topics as: industrial training and experience for full-time and sandwich students; practical work in workshops

and laboratories; the possibility of introducing an external element into the assessment of students, for example, by producing banks of questions for use by colleges (Hanrott, 1981).

Review and evaluation by other agencies

287. Various conferences and short courses reviewing TEC developments have taken place and the following are illustrations (see, for example, Heywood, 1980).

A report of a meeting organised by the Northern Branch of FERA* to develop co-operative team work in the evaluation of programmes, led by the Staff Development and Educational Methods Unit of Manchester Polytechnic, illustrates the vast range of issues which were of concern to teachers from the early stages of programme development. A brain-storming exercise with teachers identified sixty-six 'issues for genuine debate' (Further Education Research Association, 1977). Similarly teachers at a regional meeting in 1978 to discuss Mathematics units faced a list of thirty-seven possible (curriculum) topics for group discussion generated by the introduction of the new units.

288. The Welsh Joint Education Committee organised a series of one-day review meetings in September 1978 to give teachers an opportunity to share their growing experience of the 'administration and organisation', the 'teaching' and 'assessment' of TEC courses. Observation of the proceedings of these and similar review meetings provided illustrations of the diversity in practice amongst teachers and their accompanying uncertainty about appropriate or legitimate interpretation of TEC policy of the validated college programme.

DES Short Courses, organised by Her Majesty's Inspectors, for teachers from the three TEC Sectors afforded similar opportunities for teachers to share developing experiences and review developments with HMI and TEC officers.

289. A conference of the Further Education Research Association and the Society for Research into Higher Education, in January 1979, on 'The New Technician Education' (Heywood, 1980) provided opportunity for reflection on the views of some practitioners and researchers of the new TEC programmes. The editor of the conference proceedings writes 'difficulties have been experienced with the objectives approach and assessment. While there are signs that the changes brought about by BEC and TEC are in broad compass welcome, there are other signs which suggest worries about the objectives approach, assessment and the purposes of courses in relation to craftsmen, technicians and technologists'.

290. The Further Education Staff College, Coombe Lodge, has organised evaluation conferences in addition to its regular series of courses to help teachers involved in programme development. At these latter courses, TEC officers have regularly taken questions arising from teachers' concerns and thus received feedback on some of the operational practices and problems. In June 1979 two study conferences on 'Evaluating TEC Programmes' (Coombe Lodge Report, 1979) provided opportunity for approximately 80 teachers to examine and compare experience gained in the operation of programmes, and sought to help them to establish college procedures for programme evaluation. Among the predominant consequences of the introduction of the TEC programmes, in Sector A and Sector B identified by conference members were new administrative procedures for course timetabling and record-keeping with much of the work falling on teachers, and a reduction in laboratory work (reported by 62% of the respondents to a questionnaire), although some teachers (26%) reported an increase in project and practical work.

FEU Commentary

Review meetings and formative evaluation by agencies external to the colleges and to TEC highlight the diversity of practice and uncertainties experienced by teachers in their attempts to respond, in individual college contexts, to a new national policy. There is no doubt that the introduction of TEC programmes has raised questions about almost all aspects of teaching and learning and its organisation.

Clearly, support to the teachers implementing curricula should be an essential part of a major curriculum development. Teachers meeting in two groups convened by FEU as a part of this study welcomed the opportunity to exchange experiences. Along with others who were met during this investigation, they indicated that the opportunities to overcome isolationism are often rare.

The observations of a number of evaluation conferences or review meetings held during the course of this work generally corroborated evidence collected in the major components.

TEC policies emphasise the teachers' and colleges' responsibility for continuing evaluation. Colleges will need to give attention to guiding and supporting teachers in this role.

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* FERA=Further Education Research Association.

291. The FE Staff College organised in 1981 a further conference at the request of and in association with the Joint CBI/Colleges Panel to review whether 'TEC is achieving the objectives for which it was created'.

Suggestions made by the conference included the need for a review of 'the means of securing active and regular participation of employers in shaping future TEC policies and practices'; the need for TEC 'to consolidate its efforts to streamline its administrative procedures . . . to identify ways of better communicating its educational concepts and language to the widest possible range of firms, . . . for greater publicity throughout education and employment of the status and relevance of TEC awards and . . . for ways of feedback information about the progress of TEC students to assist the continued development of programmes; the need for fundamental review of the place of practical work; and the need for active investigation by TEC in consultation with both employers and college staff about how best to integrate general and communication studies into all TEC programmes'.

Review and evaluation by the colleges

292. During the period in which most of the data in this study were collected, ie the academic sessions 1978-79 and 1979-80, there was little evidence of systematic evaluation by colleges of the programmes in operation. Members of the evaluation team reported (March 1980) that *'course review and re-design were only performed in a limited way, largely due to the pressures of implementing the TEC courses'*.

FEU Commentary

Staff development

Effective curriculum development will not occur without concomitant staff development. For proposed curriculum changes to be realised in practice, implementers must have adequate understanding of the intention of initiators. In the absence of a national systematically planned staff development programme to accompany the introduction of TEC policy and the consequential changes required, support which teachers received has varied enormously from college to college and from teacher to teacher. In some colleges senior staff blamed TEC for the introduction of a new curriculum without adequate provision for the preparation of staff for the change. Some parties considered DES had not adequately funded the establishment of TEC to take account of the magnitude of the change, others saw the LEAs as deficient. The Haslegrave Report did not recommend strategies needed to bring about the change, but this was not part of its brief. The responsibility for ensuring that all those involved have adequate understanding and skills to undertake the proposed curriculum change must certainly lie with the resource providers (DES and the LEAs) who are represented on TEC as well as with both the central curriculum body (TEC) and the colleges themselves. Where for whatever reason, there is inadequate opportunity for teachers to learn of the purposes and the rationale of proposed curriculum change then the consequences are likely to be a climate of unhelpful uncertainty and individual interpretations of what should be done, rather than a coherent curriculum.

Planned involvement of teachers in curriculum development can benefit the curriculum and the quality of teaching and learning by

a. developing understanding of new proposals and providing opportunities to shape the curriculum;

b. enhancing the likelihood that the curriculum in action bears relation to the curriculum in design;

Staff development

293. **Staff development in relation to curriculum development.** A very recent national survey of Staff Development (Bradley et al, NFER 1981) discusses the concept, and provision of Staff Development in FE, and illustrates the conflicts and confusions.

About the development of TEC programmes the report says that 'in the early stages few systematic arrangements were made to help staff cope with developing new schemes and dealing with their organisation. Staff suggested that individual departments had little choice but to try to develop the skills needed to prepare submissions since places on the few courses offered were limited . . . those who were among the first to introduce TEC were particularly likely to complain that they felt ill-prepared to cope with the new procedures'.

Staff development often tends to be regarded as a peripheral luxury and less senior teachers, in particular, do not necessarily perceive a link between curriculum development and staff development.

294. **Training and guidance for teachers introducing TEC programmes.** The provision of training support for college staff introducing TEC programmes has been variable. There has been no national systematically planned programme to accompany the changes which college staff have been required to make. A CET package prepared to assist the development of skills in writing objectives and assessment items, available generally from Autumn 1977, came too late to help most of the staff who were making submissions for 1976, 1977 and 1978 starts, although its use was reported in three of the colleges visited. More recently a substantial and valuable resource package, commissioned by CET has been produced, on the relationship between objectives and teaching methods with particular reference to TEC programmes (Manchester Polytechnic Staff Development and Educational Methods Unit, 1980). A series of study conferences to assist staff preparing submissions to TEC was provided by the Further Education Staff College. However data provided by the colleges visited indicated that this has meant an average attendance of only just over 1 per college, and represents less than 5% of the total staff involved with TEC programmes. To quote a NATFHE officer *'Coombe Lodge did a lot of good work but didn't cater for enough people'*. Some colleges visited had a substantial commitment to staff development at senior management level, others had no systematic strategy.

295. Members of the evaluation team meeting 120 teachers of TEC units (Part 2B) reported that about one third had attended provided short courses, external to the college, frequently over a weekend. There was a wide range of opinion about their value – from *'very helpful'* to *'a waste of time'*. A further third referred to internal meetings and about a third claimed to have had no introduction to the new curriculum – other than the receipt of the relevant TEC unit(s) with their associated assessment requirements.

296. In one college regular internal courses for teachers had been held since 1973, although there was evidence that sometimes relatively few staff attended. The courses tended to clarify philosophy and learning. This college held a meeting at the end of the session to review the first year's experience and problems of organisation and assessment.

297. In a number of colleges guidance papers had been produced to help teachers carry out the new assessment requirements. In a college with a high proportion of teachers who had received such guidance, the Head of Department said that nevertheless there was little staff development with respect to teaching approaches: *'The majority of teaching staff were familiar with writing learning objectives, as this style of curriculum presentation was adopted in the late 1960s by the Engineering Departments and most staff had attended workshops at a College of Education (Technical) prior to 1974. A*

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and can provide an effective mode of teacher development by

c. ensuring that staff development is related to curriculum and student needs in a particular context;
d. focusing on the work of particular groups of staff rather than on staff as individuals or staff in general;
e. enhancing the idea that staff development occurs as a normal process rather than through special activities;
f. encouraging self-monitoring and evaluation of effectiveness.

Staff development needs

Among the most urgent needs in staff development are to provide

a. encouragement and opportunities for teachers to update their technical knowledge, skills and experience;
b. training in the use of tutorial and less formal teaching and learning methods;
c. training in assessment methods.

Whilst the active teacher can use the college library and other information sources to up-date him/herself at a time of rapidly changing technology, opportunities need to be planned as a part of curriculum development for teachers to spend time but not necessarily long periods, experiencing directly the environment in which technician students are now working. Short part-time secondments to local industry could help to enhance the relevance of the technician curriculum to industries' needs.

number of "in-house" seminars were organised in 1974-75 by experienced staff on the writing of learning objectives for new staff or for those existing staff lacking the necessary skills. Further departmental workshops were run and guidance papers prepared by senior staff for all teaching staff on methods of assessment for TEC. With the new curriculum and assessment methods, the next step in staff development was: how does the teacher use the new material? Despite discussion with the Training Colleges and TEC Officers this question has not been answered to our satisfaction. Staff have not been adequately prepared, and generally the teaching approach changed little with the implementation of TEC' (College H).

298. However, in another college visited, teachers had reviewed, in subject seminars, their experience of teaching and assessing units common to a number of programmes, and had produced their own notes for guidance on the time to be devoted to topics, the integration of the units and relevant laboratory exercises.

299. Many staff appear to have found themselves (to use the words of a Principal), in *'a trial and error'* situation, identifying through their group discussions their own shortcomings. Comments in this college that *'the impaling of the ideas and philosophies of TEC to staff lagged behind the implementation; it was a system without resources'*, may characterise many other college situations. It is noteworthy that in a college in which much self-learning occurred many staff indicated their belief that they did receive detailed guidance about the objectives approach and about teaching methods and procedure.

300. Development of joint-submissions across a number of colleges in which there has been LEA or RAC involvement generated more systematic attempts to provide courses to help staff involved in the development and teaching of programmes.

301. **Teacher perceptions of their needs.** In responding to questions (Part 2D) about their past and future needs for training and guidance to help them in their work, generally rather more teachers (34-40%, depending on the topic or skill) indicated they would like training and guidance to be provided in the future, than those (18-24%) who considered they had received adequate training and guidance.

With respect to future needs, the item gaining the highest response (36% of all respondents) was the need for training and guidance, 'to up-date my technical knowledge and skills', and this was followed by the need for 'help with the design and process of assessment' (24%). This supports evidence from visits of members of the evaluation team to meet teachers of specific TEC units, which similarly reported these two areas of need (Part 2B).

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Resource provision

Throughout this enquiry it has been clear that both TEC officers and college teachers have been attempting major change in curriculum provision with a minimal allocation of resources. The Haslegrave Report foresaw a TEC system leading to a saving of resources, but the national developmental costs of making the change appear not to have been estimated.

TEC accepted that the new provision had to be introduced with a minimum of resources, but the magnitude of the curriculum changes and their effect in relation to the available resources, at least in the transitional period does not appear to have been satisfactorily assessed. Trial programmes developed and run by a few colleges before wide-scale development would have revealed at least some of the implications. An estimate of resources needed for curriculum innovation should be a part of the initial situation analysis of any curriculum development project. In particular specific allocation of resources were needed for: the trial development of programmes; the training of staff appointed to develop and administer the TEC system, whether as full-time officers, or part-time moderators; the systematic provision of short training courses for all teachers of the new programmes; the preparation of new teaching and learning materials.

In its first 'year' of operation (Oct 1973-March 1974) TEC received a Government grant of £96,281, and during its first five years grants of £1,808,297. In this period income from student fees amounted to £296,247 (data from TEC Annual Reports). In contrast the budget for the Open Tech proposals are estimated as £6m to £10m per annum during the first 3 to 5 years of operation (Manpower Services Commission, 1981). Comparison of these figures illustrates the relatively low national commitment to the development costs of establishing TEC. Of course it will be argued that TEC's purpose was to rationalise

Resources for curriculum development

302. Resources for the analysis of needs and programme design. It is difficult to ascertain the extent to which the need for additional resources to undertake the magnitude of the changes required to implement TEC policies was estimated or the extent to which recognition of national and local financial constraints inhibited such estimation. In the view of a senior member of staff involved in the introduction of TEC both in a college and at a national level 'noises about the need for more resources were slow in coming from the colleges – it can take six months to one year before the pressure gets to the point where action is taken – for example following annual conferences'. In the view of officers of Regional Advisory Councils, TEC developments were occurring at the expense of other developments. The problems of introducing the programmes were greatest for the small colleges. In some colleges the need for additional resources was identified at an early stage of programme development but competing demands meant little or none were available. For example in the following college, *'during the design phase the main requirement was for staff time to carry out meaningful industrial liaison and curriculum development. A case for an equivalent 2 full-time staff was made, approved but lost in the college "staffing jungle" and the engineering department had to cope with no additional time other than "slack" and a diversion of the departmental remission time 15% to this work. Other activities on curriculum in the department suffered at the expense of TEC'* (College H).

In one joint-college development reasons given for the lack of formal allocation of man-hours to the development work include *'the extent of the demands being uncertain'* and *'timetabling of staff (to existing courses) being too difficult to unscramble to allocate a substantial time allowance to one person for development!'*

303. **Resources for programme implementation**. The demands of TEC programmes as identified by teachers have been illustrated (paragraph 199 et seq). Evidence presented by members of the evaluation team from visits to colleges shows the increased demands on material resources, and their varying availability from college to college. All programme co-ordinators met (see Part 2B), indicated that there had been an increased demand on library services and on audio-visual resources for teaching. Programme co-ordinators were unanimous in their belief that reprographic facilities were not adequate. Though the systems in operation are usually able to cope with the administration of TEC and the provision of assessment papers – they are often swamped if any sizeable demand for handouts arises. Many colleges spoke of the need for storage cabinets. In some instances staff referred to *'inadequacies of laboratory and workshop space and resource and project rooms in general, the colleges in greatest need being those less recently built and equipped'*.

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the existing provision at minimum cost, yet analysis of the Open Tech proposals shows that the key needs perceived include: to provide learning materials, to provide an information service, to provide teacher/tutor/trainer development. The strength of an Open Tech programme is argued to be 'in its capacity to provide financial and other support to bodies already active and experienced'. This is precisely what was needed on the establishment of TEC and for which resources were not provided.

Other outcomes

304. **Communication between teachers.** One of the outcomes of the introduction of TEC programmes appears to be an increase in communication and co-operation between teachers. In the words of a member of the evaluation team *'the principal advantage which was not specifically planned has been the improvement in liaison between members of staff, not simply where team teaching is being practised but in other areas as well. There is now much more evidence of co-operation, and the exchange of ideas and materials is wholly beneficial'.* Of the teachers, who responded to the questionnaire, who taught a unit also taught by one or more of their colleagues, 55% replied that they usually discussed teaching approaches with each other (and 28% replied sometimes). Fifty-four per cent indicated they usually used common schemes of work. Common phase tests were used by 55% and common end tests by 70% of the sample.

305. **The academic responsibility of teachers.** A member of the team reports his opinion that *'one of the significant features of TEC is that the college/college lecturers have an increased academic responsibility in technician education compared with the days prior to TEC'.* At the college upon which this judgement is based *'50 of the college lecturers considered that academic freedom/responsibility was one of the "best bits" of TEC'.* They welcomed the increase in responsibility while about 1 in 4 did not, the others choosing to remain neutral in their opinion. A greater proportion of lecturers teaching less than 10 years welcomed responsibility compared with their longer serving colleagues who were less decisive in their opinions.

CHAPTER 6

Summary with Conclusions

Introduction

The focus. This report describes and evaluates the introduction of new programmes in colleges in the Further Education sector, leading to awards of the Technician Education council, in Mechanical Engineering A5, Building Studies B2 and Science C1. Evidence for the evaluation was collected during 1978-1980. (Paragraphs 1-7)

Curriculum and curriculum development. A simple model of curriculum development identifies the interactive stages of analysis of the context, design, implementation and evaluation. Decision making in curriculum design and in realising the curriculum in action requires exploration of the inter-relationships between the curriculum elements, objectives, subject matter, teaching and learning methods and assessment in the achievement of aims. (8-12)

Research strategy

The report seeks to reflect typical practice and experience drawing on a random selection of 78 colleges in various components of the study. The principal sources of evidence include data from questionnaires and check lists about teachers' work activities and experience, interviews with teachers of selected TEC units, case studies of programme development, relevant documentation of developments. (13-27)

The teachers of TEC programmes

Qualifications and experience. The teachers of the technical units are older and possess a little above average teaching experience compared with FE lecturers as a whole. Teachers of General and Communication Studies are younger and have less FE teaching experience than their technical colleagues. The teachers of technical units in General Mechanical Engineering and Building Studies have substantial industrial experience although for about half of them this dates from 15 years ago. The industrial experience of teachers of Science programmes is much less and a substantial number have none. For many teachers less than half of their work is assigned to TEC programmes. (28-36)

General attitude of teachers. Teachers generally accept many of the educational approaches of TEC but not the accompanying administrative consequences and changes within existing resource limits. The more senior staff are generally more favourably disposed than those with day-to-day teaching responsibilities. The most favourably disposed group of teachers, in this sample, by discipline area appear to be those of General and Communication Studies, the least favourably disposed being technical teachers of the A5 programmes. Many teachers did not feel that a major change in the nature of course specification and assessment was necessary. Teachers' anxieties arose due to uncertainties about the standards, the additional effort and the apparent haste in development of the innovative TEC policies. (37-52)

The students of TEC programmes

Student achievement before entry. A high proportion of students (67%) in the opportunity sample possessed qualifications which would have normally allowed them entry to the previous National Certificate/Diploma courses. The sample is skewed relative to a figure of 43% in a larger NFER sample. (53-55)

Curriculum issues

Learning objectives. The use of behavioural or near behavioural objectives is of value in specifying intended outcomes of technician curricula but their limitations should be more fully understood. Care must be exercised to ensure the modified Bloom taxonomy does not dominate and limit rather than assist effective curriculum design and implementation. For example, teachers do not find the skill category 'Invention' easy to use. The units analysed, at Levels I, II and III showed a high proportion of skills in the Information and Comprehension categories which may in part be due to the simplified version of the Bloom taxonomy. Unit designers should improve the specification and analysis of objectives. This may require, in the long term a modification of the taxonomy at present used. Objectives written in the format generally adopted in TEC Standard units often contain ambiguities, and a high degree of precision in matching assessment to these objectives should not be expected. Teachers generally find objectives to be acceptable in principle, expressions of dissatisfaction relating to instances of their vagueness and imprecision. About one-third of the teachers feel constrained to follow the sequence of objectives in devising teaching and learning, the remainder making a more liberal interpretation but usually within the specified topic areas of the unit. Teachers' early experiences were that Standard units were too demanding on the student in relation to their design length of 60 hours 'class-study'. The present listing of objectives with a corresponding assessment plan can provide a more balanced and controlled assessment of a range of knowledge and skills than less systematic approaches but it is unlikely to lead to a precisely uniform provision by different teachers in different colleges. (56-78)

Teaching and learning methods. The TEC Standard unit format with objectives and an assessment plan has caused teachers to think about their general approach. In general there has not been substantial changes in teaching methods. A reduction in laboratory or practical activities by the student is the most marked change. In some colleges new materials for overhead projector transparencies and handouts for students have been developed. Students, in the sample questioned, generally held favourable views about the teaching methods they experience although some report that they find the expected rate of learning to be too rapid. Over half seemed sceptical about the value of General and Communication Studies in helping them to communicate technical information to others. Student learning experiences continued to be centred around a formal input and study rate determined by the teacher and the college. In general, colleges find it difficult to organise tutorial or less formalised approaches to learning for the day-release student. TEC's policy aspirations in this direction are generally not yet being achieved. (79-87)

Subject matter. The Building Studies B2, Certificate programmes generally have greater uniformity than the Mechanical Engineering A5, or Science C1 programmes, reflecting the fewer Standard units available. The unit structure provided opportunity for programmes to be designed to meet the more specialist needs of particular technicians and industries, although the content of programmes appears to be strongly influenced by TEC Programme Committees and requirements of Professional bodies. TEC policy has generally enhanced the status of general studies and communication studies. The relationship between General and Communication Studies and 'O' level English Language, and the assessment of affective objectives requires further study and development work. (88-103)

Assessment of learning. The requirements by TEC for colleges to provide detailed assessment specifications implied a precision to the assessment process which in practical terms has proved unattainable and untenable. A wide diversity of plans have been drawn up typically based on intelligent guesswork and limited previous experience. However such plans offer a more balanced and controlled assessment of knowledge and skills than less systematic approaches providing teachers receive appropriate guidance in their use. The further TEC Guidance Note No. 8 eases the demands upon colleges but de-emphasises the role of formative assessment in the learning process compared with earlier intentions. In the case of the units analysed, the overall numbers of students gaining Merit and Pass grades were similar. About 16% of the students, overall, failed to meet the Pass requirement. A large variation in the distribution of grades at different colleges underlines the importance of moderation. TEC should monitor and publish data which analyses the patterns of student achievement and in relation to student and college characteristics (eg student achievement patterns before entry). Teachers generally believe that their involvement in assessment and examination is likely to lead to more successful educational provision, endorsing TEC policy. Many believe that 'the assessment processes are effective in measuring whether students achieve the programme objectives'. Teachers of Mechanical Engineering A5 programmes indicated that they would prefer external examination of Level III units to college-based assessment. This probably reflects their concern for the concept of an external national standard as much or more than the work demands made upon them by the internal college provision. TEC's policy on assessment provides opportunity for a 'mastery' approach to learning, and 'criterion-referenced' testing. However it also acknowledges testing to discriminate levels of achievement, and a conflict between a mastery and 'norm-referenced' approach. This is not always apparent to the teacher. In practice colleges have found the organisational and resource demands too great to successfully change from an essentially group paced learning approach to a new provision which potentially caters for individual learning and achievement rates. (104-116)

Curriculum statements. TEC policies and validation practice emphasise the definition of aims, learning objectives and an associated assessment specification. In so doing TEC has caused teachers to focus on the *ends* to be achieved rather than the *means*, the learning experiences, through which they may be achieved. There is a strong case for including valued teaching and learning activities in the curriculum specification. Not to recognise the dynamic inter-relationship between these ends and means in decision making when specifying the curriculum can result in a curriculum out-of-balance on implementation. In the development and review of units and programmes, colleges and TEC should consider the desirability of describing teaching and learning strategies for the guidance of teachers. (pages 51-52)

The process of curriculum development

Development at national level – The origin and nature of the change. The Haslegrave Report recommended the machinery at national and regional level for administering a new broad pattern of technician courses. However it did not consider organisational change at the college level and TEC began one of the most wide ranging curriculum validation exercises ever attempted without guidance in this respect. The policies formulated by TEC on the basis of the report required radical curriculum change from the previous provision in terms of curriculum administration, structure and specification, of teaching approach and assessment procedures and of teacher participation in development and assessment. With insufficient resource to undertake research and development work before wide scale implementation, the consequential organisational problems experienced by colleges in the early years of implementation are not surprising. The magnitude of the changes emanating from TEC's implementation of the Haslegrave Report do not appear to have been anticipated. (117-123)

Some assumptions apparent in TEC policy. The authoritative TEC Policy Statement of June 1974 emphasises organisational and administrative rather than pedagogical matters. It assumed there was little need to provide rationale for many of the decisions. In further development the reasons for particular policies or changes in policy should be explained as part of the process of engendering an acceptance of the need for change. Programmes of teacher development were not initially perceived as a systematic part of the process of curriculum development. TEC appear to have assumed, following the Haslegrave report that teachers and colleges were likely to be receptive to the new proposals, to co-operate within and with other colleges, and to have time to undertake curriculum development. Whilst teachers have found sufficient enthusiasm and willingness to sustain the development, collaboration is constrained by commitment to existing courses and students, and by the time and resources available. (124-125)

Programme development. The guidelines for Standard programmes and the Standard units have much influenced programme development in colleges. The almost universal adoption of 15 unit Certificate programmes illustrates colleges rapid acceptance of the norms they perceived acceptable. The early years were characterised by hasty development without trials, inevitable with few full time TEC officers but many committee members undertaking a heavy validation load. The rapidly produced Standard units enabled colleges to make and TEC to validate a large number of submissions in accordance with the scheduled timetable. The lack of trial resulted in widescale adoption of units of uncertain quality and uncertain demand upon teachers and students. The autonomy of Programme Committees was in accordance with the policy of flexibility. A more phased introduction might have allowed Sector Committees to achieve more commonality of practice across Committees. The Council contrary to the recommendations of the Haslegrave Report established its independence of the Regional bodies for the purposes of validation and assessment. Whilst minimising the influence of the old on the new provision in establishing a national system of awards on opportunity to profit from existing mechanisms was lost. The Regional Advisory Councils generally have facilitated curriculum development meetings of college staff in so far as their own resources have allowed. (126-142)

Development in the colleges

Analysis of needs before curriculum design. TEC's validation requirements have encouraged colleges to identify the needs of employers. The accent has been on what students learn rather than how they should learn. TEC's policy that decisions regarding the teaching of the programme are not the subject of validation risks the implementation of the real 'curriculum in action' being unnecessarily divorced from the curriculum design. (143-147)

Consultation with industry. The extent, depth and effectiveness of consultation has varied from college to college, involving in particular employer participation in development committee meetings. Difficulties of consultation have been most acute for colleges with many small employers in their neighbourhood. Colleges reported that many employers were often unaware of the proposed change in course provision and did not understand the need for a major change in structure. They were concerned that the standards which they associated with existing courses should be maintained. Colleges often found difficult the task of identifying specific technician functions. The need for student technicians to develop communication skills was widely recognised. Satisfaction with an existing provision is a barrier to innovation. In maintaining and making new contacts with employers, colleges should supply local firms with succinct reports of relevant TEC programmes and invite opinion on draft curricula through personal contact and visits wherever possible. (148-161)

Completing TEC programme validation forms. Validation forms completed by colleges and submitted to TEC exercise a strong influence and control upon the deliberations of colleges and teachers at the programme design stage. When little or no resources are specifically allocated for curriculum development then attention is only likely to be given to those aspects for which information is directly requested. Political expediency prevails. The validation process is a postal exercise, with unavoidable limitations, involving analysis of the 'internal coherence' of the curriculum proposals on paper. The extent of commitment or involvement of the teachers individually or as a team is left to the college. Where colleges adopt guidelines of the Council or Programme Committees (eg lists of aims, or Guidance Notes No. 8 on assessment) without accompanying rationale or discussion the validating committee has little evidence as to the extent which these have been discussed or influenced teachers. TEC's encouragement that colleges should select their own unit assessment plans has led to a diversity of proposals. In the absence of trials TEC officers were unable to advise on good practice, hence many experimental plans were developed. (162-173)

Teacher participation in programme development. Heads of Department have generally been the members of staff most involved in programme development both in decision making and in development work. Many Principal, Senior and Lecturer IIs took part in writing objectives and particularly assessment analyses. Few Lecturer Is were involved in these tasks and in decisions made. They had the greatest time allocation to teaching the existing courses alongside which curriculum change takes place. Principals and Vice Principals appear to have substantial involvement only when their own academic discipline or professional experience coincides with the areas under development. In accordance with their major commitment, Heads of Department were seen by their colleagues to be the people most influential in determining the timescale of programme development. Departmental boundaries often provide barriers to easy development and negotiation across them can be difficult. (174-186)

Inter-college joint programme submissions. Depending on programme area, 30-55% of the colleges have been involved in developing programmes jointly with other colleges. Such collaboration enabled the workload of early development to be shared and the teachers involved to gain mutual support necessary in undertaking innovative development work. Advantages perceived included the opportunity for sharing ideas and experience and for common standards and assessment. Collaboration must overcome problems of rivalry between colleges, of scarcity of time for travel and attendance at meetings, and organisational complexities of institutions working together. Compromises have to be made which may be on political rather than educational grounds, and which give doubts that the needs of local employers are being met. Colleges participating in joint schemes have experienced the administrative complexity of making changes in agreed programme specifications and in maintaining continuity of joint development, for example in establishing assessment item banks. Collaboration seems particularly appropriate and advantageous in the case of smaller departments. In the case of large departments and heavily subscribed programmes the disadvantages may outweigh the advantages. Joint developments risk reducing the numbers of staff involved and committed to development. Disparate college sizes and resources for development and allegiance to different Local Education Authorities may inhibit collaboration. (187-197)

Programme implementation

Effects on the day-to-day work activities of teachers. New procedures mean more work at least until they become familiar. Teachers, in the 1979-1980 session, were spending a greater proportion of their time on tasks associated with the assessment of learning, compared with previous technician courses. The effect on their teaching activities appears to be much less, although apparently there is more collaboration between teachers, and more preparation of handouts for students. The three categories in which teachers spend most of their time are 'Assessment', 'Preparation for teaching' and 'Teaching', the former two categories having increased relative to work on non-TEC courses. When teachers say the introduction of TEC programmes has caused more administration and paper work they are generally referring to the work they associate with the assessment procedures. A provision which gives the teachers a predominant share of the responsibility for the assessment of their students with external monitoring through validation and moderation will almost inevitably require more documentation of intentions, practice and performance. Colleges have found it necessary to introduce new procedures to record details of student entry qualifications, achievement and progress, as a consequence of the unit structure. However the keeping of records is an essential part of the teachers' role and can assist effective counselling. Much of the implementation of the newly validated programmes appears to be characterised by colleges responding to problems as they arise rather than prior anticipation of needs or difficulties. Continuing change is a characteristic of curriculum development, but had evidence been available from trials unprofitable experimentation might have been avoided. (198-215)

Adoption of Standard units. The majority of colleges adopted many Standard units making few amendments, in spite of the criticisms of the quality of expression of some of the objectives. This reflects the limited expertise at writing objectives in many colleges, the lack of time and resources for this development work and the belief that their adoption would facilitate the validation of the programme. (216-219)

The unit-based programme structure. TEC wisely constrained the choice of units available in a programme by requiring each combination of units to be validated in an attempt to ensure coherent courses. The availability of approved combinations can be severely restricted by factors such as viability of student numbers, employer and teacher influence, teacher availability and expertise, pattern of study release given by employers, availability of classrooms. Colleges often found they were unable to offer all the alternatives which they had envisaged. Alternative combinations may be more or less academically or practically orientated, and cannot be directly comparable in terms of the intellectual demands made on the student. Whilst the grouping of students of different programmes (eg electrical, mechanical, motor-vehicle, medical, laboratory science technicians) to study common units is advantageous from a timetabling and resource point of view, teachers often believe that students learn best if working together in a group who share common vocational intent. For the advantages of the unit structure to be maximised employers need to be flexible in their approach to the pattern of release for the part-time student and colleges need to consider how the variable study rates of individual students can be catered for. The unit structure has increased the demands on the teacher in his role as counsellor. (220-231)

Assessment and re-assessment. In the absence of information from trials, colleges designed assessment plans too elaborate to operate in terms of available resources and expertise. The self-contained nature of each unit and its own assessment plan has generally resulted in each unit being assessed as a separate entity.

Teachers have found difficulty in interpreting assessment plans to take account of the categories of knowledge and skills. The requirement that students should obtain a minimum mark in each assessment component has caused problems in organising 're-tests' for part-time students. A variety of solutions have been attempted. There is a danger that requiring students to pass all phase-tests before proceeding may unduly limit their time to assimilate new material. Whether units are assessed by phase-tests or end-tests may be the consequence of rather arbitrary decisions. Teachers have found it necessary to ensure that students do not abuse procedures which provide opportunity for resitting phase-tests. Clear distinction should be made wherever possible between testing which is primarily to aid the process of learning (eg by providing feedback and help to the student and teacher) and testing which is to measure the achievement of competency. In the former case assessment may be less formal and re-testing may not always be necessary. (232-242)

Factors helping and hindering change

Factors helping the development process. Teachers have found much benefit from external contacts, meetings and working groups which have enabled them to overcome uncertainty and gain confidence. Collaboration can stimulate creativity. The innovation process is facilitated by external agents who can mediate between TEC, at the centre and the colleges. In this respect TEC Advisory Officers played a key role in so far as their time allowed. Teachers found personal contact with them more rewarding and beneficial than correspondence. Care must be taken to ensure that the advisory function does not lead to central solutions inappropriate to local problems. Innovation is facilitated in those colleges where there is efficient information flow, where teachers have a clear understanding of the rationale for change and opportunity for developing new skills. Fortunately many teachers are motivated to do their best for their students. The provision of Standard units enabled some colleges to gain validation of a programme at an earlier date than would otherwise have been possible. (243-251)

Factors hindering development. Innovation implies change in values and value conflicts are a significant barrier to change. People prefer the familiar to the unfamiliar. Many teachers believed in the adequacy and standards of the pre-TEC courses, and the new TEC proposals engendered a climate of uncertainty. Teachers reported a lack of information and a slow response from TEC in the early stages of development, due to its limited resources. In some colleges communication problems were internal. Many teachers were unfamiliar with the 'jargon' used by TEC and needed more consultancy/workshop support than was available. The geographical separation of staff workrooms in some colleges gave rise to relationship and communication difficulties which are barriers to innovation. Developments were carried out in too much of a rush and TEC were criticised for not setting up and monitoring some pilot schemes. Lack of clarity of purpose can be major causes of innovation failure. Colleges generally did not have sufficient resources and experience to do other than develop programmes for different technician fields independently of each other reflecting the TEC programme committee structure and working within their own departmental boundaries. Lack of formal allocation of time for development work caused staff to give priority to look after the needs of students on existing courses. Many staff did not have the training and guidance necessary to undertake the tasks of writing objectives and in particular, designing assessment plans. (252-261)

Evaluation

Moderation. The first handbook for part-time moderators was issued in Autumn 1979, although moderators were first appointed for the 1976-77 session. More systematic training of moderators in the early years would have enhanced the credibility of the provision. Colleges have welcomed the moderator as an external agent linking the college to a national TEC system. Teachers tend to respect a moderator's competence as a subject specialist, but doubt whether he can make valid commentary on the programme as a whole, or assess the standard of the programme in relation to national provision. This in part is due to their previous understanding of the role of an external examiner as a 'subject' assessor. The demands on a moderator of programmes with large numbers of students are severe. Moderation should be regarded as no more than a sampling procedure. Training and guidance for moderators is needed to develop a more uniform interpretation of TEC policy and practice. Moderators, in the Autumn of 1979, were concerned about the problems of communication between themselves and TEC, about their role and duties, and about the marks and grades to be awarded when students re-sit phase-tests. (262-272)

Aspects overlooked in programme design and changes which have been or should be made. The amount and administrative burden of assessment was not anticipated nor were the logistics of the re-assessment of students. Inadequate attention was given in the design of units to the possibility of overlap and fragmentation and the time needed for students to absorb the level and amount of learning required. The amount of time needed for basic curriculum development work in introducing a new system and the lack of resources and costs required for effective implementation were underestimated. Much of the most time-demanding work of curriculum development occurs at the implementation stage since this is close to the curriculum in action. TEC has responded to the pressure to reduce the demands of the assessment process by issuing revised Guidance Notes. Many colleges have made changes to assessment plans and reduced the content of some units. Teachers vary in the extent to which they believe change is legitimate without seeking formal approval of the moderator or revalidation. Where changes have not been made teachers believed there should be a reduction in the amount and time spent on testing, a reduction in unit content and in administrative and paper work. They identified the need to plan and review programmes as a whole reviewing the links between units. (273–282)

Other review and formative evaluation. Although TEC did not formally build formative evaluation into its early curriculum planning, the Council and its Officers have been responsive to many of the changes required by colleges following initial experience of programme operation. Review meetings by agencies external to colleges and TEC highlighted the diversity of practice and uncertainties experienced by teachers in their initial response in individual college contexts to new national policies. (283-292)

Staff development

Effective curriculum development will not occur without concomitant staff development. In the absence of a national phased system of planned staff training to accompany the introduction of TEC policy, the support which teachers received varied enormously from college to college and teacher to teacher. Responsibility for ensuring that all those involved in curriculum development have adequate guidance lies with the DES, LEAs, TEC and the colleges themselves. When there is inadequate opportunity for teachers to learn of the purpose and rationale of proposed curriculum change then the consequences are likely to be a climate of uncertainty and individual interpretations of what should be done. Planned involvement of teachers in curriculum development can improve the quality of teaching and learning and be an effective form of teacher development. The introduction of TEC programmes has been curriculum development by trial and error. One of the most urgent needs is to provide opportunities for staff to update their technical knowledge skills and experience. Training in assessment procedures and in the effective use of less formal teaching and learning approaches is needed. Lack of required skills can be a cause of curriculum innovation failure. (293-301)

Resource provision

TEC officers and college teachers have undertaken major change with a minimal allocation of resources for the necessary development process, for example, of research and dissemination. Recent budget proposals for an Open Tech illustrate the relatively low national commitment made to the development costs of establishing TEC, yet the requirements were similar; finance for learning materials, an information service, teacher development. TEC has caused an increase in demand by colleges for material resources. The efficient organisation of learning requires increased reprographic facilities. (302-303)

Other outcomes

The reported increased communication and co-operation between teachers is likely to mean a more favourable climate for further development. (304-305)

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APPENDIX 1

A Matrix of definition of Learning Objectives*

Classification	Knowledge	Skill	Understanding	Appraisal
Progressive Stages ↓	*Perception* initial insight *General Survey* appreciation of inter-relationships *Cognisance* differentiation between contents	*Aptitude* ability to carry out operations *Competence* polished performance *Mastery* highest degree of proficiency	*Awareness* of important aspects of a problem *Insight* solution to a problem is thought of and worked out *Comprehension* solution to problem tested and if appropriate accepted	*Frankness* Inclination Interest Respect Pleasure Willingness Determination

* Rudiments of Curriculum Planning, Kultus and Unterricht, 1977 – see Westphalen (1977).

APPENDIX 2

An example of a TEC Standard unit Assessment Analysis or Specification

TEC U76/053
Engineering Science II

9. ASSESSMENT SPECIFICATION

The following gives the unit breakdown, by topic and types of learning, as a key to the production by a college of its assessment specification for this unit.

Unit topic area	Topic as % of assessment	% of total assessment				
		Motor skills	Intellectual skills			
			Information	Comprehension	Application	Invention
A	20	10	5	5		
B	20		7	8	5	
C	25		5	12	8	
D	20		10	10		
E	15		8	5	2	
F						
G						
H						
I						
Percentage of assessment for entire unit →		10	35	40	15	

APPENDIX 3

An example of a completed Validation Form VAL IVA, Assessment Information

PLEASE READ 'NOTES ON SUBMISSIONS FOR VALIDATION' BEFORE COMPLETING THIS FORM

Sheet

No. of

TECHNICIAN EDUCATION COUNCIL

Programme Code Number

VAL IVA: I

VALIDATION FORM VAL IVA
ASSESSMENT INFORMATION

Notes:

(a) A separate form will be required for each programme in a group of programmes.
(b) Use a continuation sheet if necessary.

1. Group of Programmes only

Award Title of Programme........MECHANICAL AND PRODUCTION ENGINEERING (CERTIFICATE)........

2. Joint Submissions only

College Name..
(or enter 'Joint Assessment Scheme': see VAL IVA iv)

3. Overall Approach to Assessment (Please include any general statement which the college may wish to make)

Moderation and Assessment will be the responsibility of the Mechanical Engineering Department Programme Committee. The principle of continuous assessment will be applied, wherever possible, to evaluate progress. Assessment will be based on practical and written tests in conjunction with course work undertaken both within and outside the College. The general attitude of the student to his studies will also be considered.

The normal requirement for an ordinary or credit pass in a unit is detailed in VAL IVA(ii) and (iii), but special cases will be referred to the Committee for their decision. Assessment will be reviewed periodically.

4. College's policy on progression of students who are not successful in a unit

(a) What action will be taken if a student fails an in-course assessment or the overall assessment for a unit.

Following consideration by the Committee, the student may
(i) be given credit for the unit or a referred pass to the next level in the subject, or

(ii) be retested in the identified areas of weakness, or

(iii) be required to repeat the whole or part of the unit.

(b) In what circumstances and when may students be recommended for an award although not successful in one of the final stage units.

Students who study for more than two level III units to complete a programme and fail one of them by less than 10% will be recommended for the award of a certificate.

PROGRAMME CODE NUMBER | Sheet

ASSESSMENT PLAN | VAL IVA ii | No 1 of 2

MATCH WITH UNITS LISTED ON VAL III : ii AND VAL IVA : iii

INDIVIDUAL ASSESSMENT TESTS	ASSESSMENT NO. 1				ASSESSMENT NO. 2				ASSESSMENT NO. 3			
UNIT NO.	TOPIC AREAS	SKILL AREAS	TYPE OF TEST	% OF TOTAL ASSESS.	TOPIC AREAS	SKILL AREAS	TYPE OF TEST	% OF TOTAL ASSESS.	TOPIC AREAS	SKILL AREAS	TYPE OF TEST	% OF TOTAL ASSESS.
01	AB	MIC	S	25	CD	MIC	SL	25	EF	IC	SL	10
02	AF	MIC	SC	20	BE	IC	SC	20	DI	MIC	SC	20
03	AB	MIC	S	20	CD	ICA	S	20	EFG	IC	S	20
04	A	MI	SC	30	B	MI	SC	30	AB	MC	L	40
05	A	I	S	10	B	ICAV	SL Oral	50	C	ICAV	MSL Project	40
06	ABC	ICA	SL	20	DE	MICA	SL	20	FG	MICA	SL	20
07	AB	ICA	S	30	CD	ICA	S	30	A-D	ICA	SL	40
08	AB	ICA	S	30	CD	ICA	S	30	A-D	ICA	SL	40
09	AB	ICA	S	30	CD	IC	S	30	A-D	ICA	SL	40
10	AB	MIC	SC	25	C	IC	SC	15	D	IC	SC	10
11	AE	MIC	SLC	50	BC	IA	SL	10	DF	ICA	SL	40
12	A	ICAV	SL Oral	40	B	ICAV	MSL Project					
13	A	MI	SC	10	BD	IC	SC	20	C	IC	SC	10
14	A	ICAV	SLC	17	B	MICA	SLCP	26	C	MICAV	SLCP	17
15	A	ICA	SL	20	B	ICA	SL	20	C	ICA	SL	20
16	A	ICA	SL	40	B	I	SL	15	C	ICAV	SLC	45
17	A	ICA	S	25	BC	ICA	S	20	D	ICA	S	15
18	A	IC	SC	25	B	IC	SC	25	C	ICA	LC	10
19	A	I	S	5	B	IC	SC	25	C	I	S	5
20	ABCD	MICAV	C	20	EFGH	MICA	C	30	IJ	MIC	C	10
21												
22												
23												
24												
25												
26												
27												
28												

CODE:

Skill Areas I = Information; C = Comprehension; M = Motor skills;
A = Analysis; V = Invention.

Type of Test S = Short answer; C = Course work; L = Long answer;
P = Practical; M = Multiple choice questions.

CONTINUATION SHEETS AVAILABLE FOR MORE ASSESSMENTS AND FOR PROGRAMMES WITH MORE THAN [illegible] UNITS

PROGRAMME CODE NUMBER

ASSESSMENT PLAN (continued) VAL IVA ii

Sheet No. 2 of 2

INDIVIDUAL ASSESSMENT TESTS	ASSESSMENT NO. 4				ASSESSMENT NO. 5				ASSESSMENT NO. 6			
UNIT	TOPIC AREAS	SKILL AREAS	TYPE OF TEST	% OF TOTAL ASSESS.	TOPIC AREAS	SKILL AREAS	TYPE OF TEST	% OF TOTAL ASSESS.	TOPIC AREAS	SKILL AREAS	TYPE OF TEST	% OF TOTAL ASSESS.
01	A-F	MIC	MSL	40								
02	ABD EFI	CA	L	40								
03	A-G	MICA	SL	40								
06	A-G	MICA	MSL	40								
10	E	IC	SC	10	A-E	CA	L	40				
13	EF	IC	SC	20	C-F	CA	L	40				
14	A-C	MICAV	SLC	40								
15	A-C	ICA	SLC	40								
17	A-D	ICA	SL	40								
18	AB	CAV	L	40								
19	D	IA	SC	25	ABCD	CAV	L	40				
20	A-J	MICAV	C	40								

ASSESSMENT PLAN (continued)

PROGRAMME CODE NUMBER ☐☐☐☐☐☐☐☐☐☐ VAL IVA iii

Sheet

No. 1 of 1

MATCH WITH UNITS LISTED ON VAL III : ii AND VAL IVA : ii

	CRITERIA FOR THE AWARD OF PASS/PASS WITH MERIT								OVERALL % FOR UNIT RESULT		TOTAL ASSESSMENT TIME	
UNIT NO.	MINIMUM % REQUIRED IN EACH ASSESSMENT											
	1	2	3	4	5	6	7	8	PASS	MERIT	HOURS	MINS
01	40	40	40	40					50	65	5	20
02	40	40	40	40					50	65	4	30
03	40	40	40	40					50	65	3	0
04	40	40	40						50	65	4	0
05	40	40	40						50	65	4	15
06	40	40	40	40					50	65	6	0
07	40	40	40						50	65	2	20
08	40	40	40						50	65	2	20
09	40	40	40						50	65	2	20
10	40	40	40	40	40				50	65	4	10
11	40	40	40						50	65	4	30
12	40	40	40						50	65	4	30
13	40	40	40	40	40				50	65	4	20
14	40	40	40	40					50	65	5	0
15	40	40	40	40					50	65	5	0
16	40	40	40								5	30
17	40	40	40	40					50	65	3	30
18	40	40	40	40					50	65	4	15
19	40	40	40	40	40				50	65	5	0
20	40	40	40	40					50	65	—	—
21												
22												
23												
24												
25												
26												
27												
28												

Further Education Curriculum Review and Development Unit

Publications

Title	*Date Published*
Experience, Reflection, Learning – suggestions for organisers of schemes of Unified Vocational Preparation	April 1978
A Basis for Choice – Report of a Study Group on Post-16 Pre-Employment Courses	June 1979
Supporting YOP – suggestions for colleges involved in the Youth Opportunities Programme	June 1979
Active Learning: A Guide – to current practice in experiential and participatory learning	December 1979
Developing Social and Life Skills – strategy for tutors	March 1980
Active Learning: A Register – of experiential and participatory learning. Parts 1 and 2	May 1980
Day Release – A Desk Study	July 1980
Further Opportunities in Focus – a study of bridging courses for women	July 1980
FEU Response to 'Outlook on Training' – Review of the Employment and Training Act 1973	July 1980
Annual Report 1979-80	August 1980
Loud and Clear? – summary of a study of curriculum dissemination in further and higher education	August 1980
Beyond Coping – Review and Synthesis of Research and Development in Social Education	August 1980
FEU Response to White Paper 'Special Needs in Education' (Cmnd 799)	August 1980
FEU Response to 'Examinations 16-18' Consultative Paper	December 1980
FEU Response to 'Continuing Education'	January 1981
Signposts – – A map of 16-19 educational provision	January 1981
Vocational Preparation	January 1981
Transition and Access – a review of low level courses in ILEA	February 1981
Curriculum Control – a review of major styles of curriculum design in FE	March 1981
FEU Response to 'CET: Open Learning Systems in Further Education and Training (December 1980)'	March 1981
FEU Response to Rampton (now Swann) Committee	April 1981
FEU Response to 'MSc – An "Open Tech" Programme' – a consultative document (May 1981)	June 1981
FEU Response to 'A new training initiative' – MSC consultative document (May 1981)	July 1981
Balancing the Equation – a study of women and science and technology within further education	August 1981
Annual Report 1980-81	August 1981
'How Do I Learn?' – an experimental programme to introduce young people to the many ways of learning	October 1981
Students with Special Needs in FE	October 1981

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